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Original Communications

RECENT VIEWS OF SOME DUCTLESS GLANDS.*

By CHARLES MINOR BLACKFORD, M. D., Staunton, Va.

Among the greatest additions to the sum of human knowledge of animal physiology which have been made within the past quarter of a century has been the determination of the functions of the ductless glands and, although there is far more yet to be learned than has already been brought to light, the facts at present known have opened a field for the treatment of conditions which have hitherto been regarded as hopeless. Idiocy, gigantism, or the over-development of the bones; acromegaly, or the over-growth of the extremities; the corresponding under-development of the body in which the patient remains short in stature, with a child-like face and small feet and hands, and with the secondary sexual characters either undeveloped or imperfectly developed, and other conditions to be described later, are now known to be due to the over-functioning or the under-functioning of certain of these little understood glands, and to be subject to treatment which will produce favorable results. So astonishing have been the results already obtained by the use of the internal secretions of these glands, or, as they are called by many students, the "incretions," that the danger of exaggerating their powers and giving them over-importance is becoming a serious one. In articles written by really learned men, and especially in articles intended for the instruction of intelligent laymen,—to say nothing of the productions of imaginative newspaper reporters,—there is a tendency to assume matters of mere speculation or conjecture to be ascertained facts, and consequently to raise hopes which will be followed by disappointment, disillusion, and possibly a loss of faith in scientific research among those whose faith and goodwill are of the utmost importance to science. It must be constantly borne in mind that the study of the incretions is very new and that very little is known of them, either from a chemical or physiological standpoint, and in advising their use therapeutically, too much must not be promised the sufferer who sees in them the only possible relief from some fearful malady.

Although many of the organs of the body have been credited with making incretions, there are but seven whose functions are at all clearly understood. These are (1) the thyroid gland, (2) the parathyroid glands, (3) the pituitary gland or hypophysis cerebri, (4) the pineal gland or epiphysis cerebri, (5) the suprarenal glands, (6) what are called the islands of Langerhans of the pancreas, and (7) the interstitial tissue of the gonads (the ovaries and testes) which constitute what is called the "puberty gland." There is evidence that each of these bodies produces an internal secretion which, distributed through the blood, exerts important chemical effects on more or less distant organs and tissues, and that without this internal secretion, these organs or tissues would either cease to functionate or would functionate improperly. The chemical materials contained in these internal secretions, or incretions, have been called "hormones," and they appear to stimulate the cells of the various organs to action much as the hormones of the spermatozoa stimulate the ova to development. The chemical composition of some of these hormones may be closely approached, even if not definitely determined, as is shown by the researches on epinephrin, a product of the medullary portion of the suprarenal gland, and on iodothyrin and thyroxin, materials obtained from the thyroid gland. At present physiological chemistry can hardly be said to be in its infancy; it is barely in its embryonic stage. Living tissue cannot be analyzed without killing it, and between living tissue and dead tissue lies a vast gulf whose precise nature we do not know. When we make an extract from a living or-

*Read before the Medical Association of the Valley of Virginia at its meeting in Clifton Forge, September 28, 1922.

gan and then pull it to pieces by our analytical methods, we do not know what artifacts we are producing, but we may be certain that the products are quite different from the products of the sound, living organ. At present when we try to use hormones therapeutically, we do so by administering the gland from which the desired agent comes, or an extract from it; but this is as crude as it would be to administer cinchona bark in a case of malaria instead of giving the active agent, quinine. We are certainly giving quantities of inert materials and possibly injurious agents, in the crude gland, and before glandular therapy can become truly scientific, organic chemistry must advance to the point at which the pure hormones may be isolated.

The principal methods by which the functions of the ductless glands may be determined in the human subjects are (1) to observe the clinical syndromes and then, by post-mortem examination, to ascertain whether certain syndromes are invariably associated with morbid conditions of certain glands, and (2) to ascertain what effects are produced in certain morbid states by the administration of certain glands or extracts from them. Experiments have been tried on the lower animals by transplanting glands; by surgical extraction of glands and by injections of concentrated extracts of the glands, or, when possible, of single hormones, and noting the results. Time and space will not permit reference to more than a few of these results, but I hope that these may be good illustrations of what is being discovered.

The first of the ductless glands to attract attention was the thyroid, and it is probably the best known member of the group. In 1859 Shiff, of Geneva, found that the removal of the thyroid gland from a dog caused violent nervous disorders and death, and in 1882, the brothers, J. L. and A. Reverdin, showed that in certain goitrous subjects and after the removal of the thyroid in some cases of goitre in which such symptoms had not been manifested up to the time of the removal, trophic and nervous disturbances developed. It is obvious that these symptoms follow a lack of some substance normally elaborated by the thyroid, and in 1877 Ord applied the name "Myxoedema" to the disease produced by thyroid insufficiency. In 1880, soon after Ord had determined that myxoedema sprang from a deficiency in the function of the thyroid, Sandstrom, a Swedish physician, discovered two small bodies external to the thyroid, and in 1893, Nicolas, of Nancy, discovered two glandules internal to the thyroid, and these four bodies have been called the parathyroid glands. As the thyroid and the parathyroids are connected with the same blood vessels, it is apparent that physiologically this group of glands must be considered together. Recent writers have given some carefully detailed accounts of the differing clinical results following the removal of the thyroid without removing the parathyroids and of removal of the parathyroid while leaving the thyroid intact,* but as affections of the one commonly involve the other, from the standpoint of the physician they may be regarded as one organ, and will be so regarded in this paper.

In typical cases of exophthalmic goitre, known also as Graves' disease or Basedow's disease, there will be found an enlarged, pulsating thyroid gland; a pulse rate of 150 or more to the minute instead of the normal rate of about 72; a protrusion of the eyeballs, from which the name "exophthalmic" is derived; a tendency to profuse sweats and watery diarrhoea; and great sensitiveness to heat. In addition to these symptoms the patient is apt to have an over-alertness of mind and abnormal timidity, and there is a tendency to emaciation, notwithstanding an abundant food supply. If a normal subject be fed with thyroid extract, a similar syndrome will be developed, and it is therefore believed that in exophthalmic goitre there is over-functioning on the part of the thyroid gland.

In myxoedema, or Gull's disease, a condition is found which is diametrically opposed to that in Graves' disease. The thyroid gland is small; the pulse rate is usually slow; the eyes look sunken with a narrowing of the lid-slits; the bodily movements are slow and awkward; and mentally the patient is dull, forgetful and apathetic. There is increased sensitiveness to cold and a tendency to constipation; the hairs tend to fall out; the skin becomes dry and wrinkled, and the patient is disposed to obesity in spite of a restricted diet. As this condition follows the removal or degeneracy of the thyroid gland and as such patients improve rapidly when fed the thyroid of sheep,

*See "The Internal Secretions and the Principles of Medicine," by Chas E. de M. Sajous, M. D., etc. Tenth Revised Edition, Vol. 1, page 144 et seq.

it is believed that myxoedema is due to under-activity or under-functioning of the thyroid gland.

Two contrasting syndromes are produced by over-activity and under-activity of the pituitary gland. Sajous† seems to regard the pituitary body as a general center for the nervous system and to look on its relations to the nervous system as far more important than its functions as a gland. Without venturing to speak as one having authority on this subject, I think it is well to bring forward the two contrasting syndromes which, from the best of our present knowledge, are due respectively to over-function and under-function of this organ.

If there be over-function of the pituitary gland in early life, before the epiphyses of the long bones have united with the shafts of those bones, there is over-stimulation of bony growth and the subject becomes excessively tall, a condition known as gigantism. Should the pituitary gland over-function later in life —that is, after the epiphyses have united with the shafts of the long bones,—there will be a bony overgrowth, but it will be seen in an increased size of parts of the skull and of the hands and feet, a condition known as acromegaly. The tongue and internal organs are enlarged, and the facial appearance of the patient is characteristic. The face is almost hexagonal; the nose is broad and the chin is prominent and apt to be curved upward; the cheek bones stand out and the arches above the eyes are prominent. The facial profile is like that of "Punch;" it is what is called the "nut-cracker" face, with the nose and chin approaching one another. The hands are flat and broad; the fingers are large and blunt; and the feet are abnormally large.

Should there be under-functioning of the pituitary gland during development, a condition results which is known as Froehlich's syndrome. When this results, the skeletal development is deficient. The patient is short in stature, the face remains child-like and the feet and hands are small; a state markedly contrasting with acromegaly and known as acromikria. The skeleton is apt to be defective, the growth of bone being sub-normal. The sub-cutaneous fat is greatly increased, but it is unevenly distributed over the body, being mostly over the abdomen, over the buttocks and at the upper portions of the extremities. The secondary sexual characters are poorly developed. The pubic hairs are absent or are scanty; the external genitalia remain in an infantile state, and in young men the voice is high pitched and normal virility is absent, while in young women the menstrual flow is scanty or totally missing.*

With such contrasting pictures of the results of over-activity and under-activity of the pituitary gland, it is difficult to see how this body can be regarded as other than an endocrine organ, and although it is a factor in the nervous system, it has other and possibly more important functions than being merely a central station for the nerves passing from the brain cortex to the periphery.

I wish to cite one more illustration of the effects following disordered conditions of ductless glands and this is the contrasting syndromes believed to be produced by the over-activity and under-activity of the suprarenal capsules. It is unnecessary to detail the histology of the adrenal glands, as it is doubtless well known to all of my auditors, and it will suffice to say that even to the naked eye, these bodies show two sharply differentiated parts:—an inner part, known as the medulla, and an outer part, known as the cortex, which is, in turn, covered by a connective tissue capsule, from which at intervals partitions are given off and extend through the gland tissue, growing progressively thinner until they become hardly perceptible. The cortex is of a yellowish tint, due to the fat granules which characterize its epithelium cells, and the medulla is of a reddish, vascular appearance. A solution of potassium bichromate stains brown a substance which the medullary cells contain, and cells containing this substance are found widely distributed throughout the body, especially in the sympathetic nervous system and its ganglia, the carotid glands and the posterior lobe of the pituitary gland. Wherever found, these cells are alike, and they constitute what has been termed the "chromaffine system," of which the adrenals are the main portions.

In the first edition of his work on "Internal Secretions and the Principles of Medicine,"

†See "The Internal Secretions and the Principles of Medicine," by Chas. E. de M. Sajous, M. D., etc. Tenth Revised Edition. Vol. I, Page 483 et seq.

*Lewellys F. Barker, M. D. Presidental Address at the Tenth Annual Meeting of the Eugenics Research Association, held at Cold Spring Harbor, Long Island, June 10, 1922. Published in Science for June 30, 1922.

published in 1903, Dr. Sajous advanced the view that the adrenal glands, or rather the chromaffine system, furnished a material which absorbed oxygen in the alveoli of the lungs, then became a part of the oxyhaemoglobin of the blood and was carried by the blood current throughout the body, acting as an oxidizing agent wherever it was carried. Since that time many physiologists have adopted this view, and it may be said that it is now the general belief that the adrenal bodies play a very important part in respiration. The taking up of oxygen by the haemoglobin had long been a physical mystery. It had been shown that practically all of the oxygen in the alveoli was absorbed by the haemoglobin and that the amount so absorbed did not depend on pressure nor did the interchange of oxygen and carbon dioxide follow the ordinary laws of the diffusion of gases. It was obvious that some intermediary agent was necessary, and for a while it was thought that the oxygen absorbing and carbon dioxide excreting function was performed by the lining membrane of the air cells. This theory has gradually fallen into disfavor with further research, and it is now generally accepted that this interchange is due to a secretion of the adrenal glands. In the last, the tenth, edition of Dr. Sajous' work (Vol. I, page 60 et seq.) a full history of the experimental proofs on which the new belief rests is given, and it is needless to repeat it here.

The chief clinical pictures believed to depend on disorders of the suprarenals are presented by the syndrome of under-activity, usually known as Addison's disease, and a corresponding syndrome which is thought to be produced by over-activity of these organs. In Addison's disease there is great weakness and prostration; the blood pressure is low; diarrhoea and other digestive disturbances are common; there is a chronic anaemia and often a peculiar bronzing of the skin which is almost diagnostic. This symptom has been given too much prominence, however, and the dictum "No bronzing, no Addison's disease," has no doubt proven unfortunate for the patient in many cases, for many instances of advanced lesion of the adrenals, as shown by post-mortem examinations, have shown no bronzing of the skin.

On the other hand over-activity of the suprarenals presents a peculiar clinical picture, though one which differs according to the time at which the over-activity begins. When the onset occurs during foetal life, pseudohermaphrodism is apt to occur; the child presenting the external genital appearances of one sex associated with the internal organs of the other. Should the presumed over-activity set in soon after birth instead of during embryonic life, puberty is apt to come on prematurely; a little girl of three or four years having been known to menstruate regularly and to show the mental and bodily sexual attributes of an adolescent, while a boy of seven may present the external genitals and other sexual characters of an adult. Should the over-activity of the suprarenals not develop until middle life, it will show itself by the rapid development of hairiness all over the body (hirsutism) and by the exhibition of marked masculine characteristics (virilism).*

Important as the functions of the adrenals may be as shown in these syndromes, it is the growing belief that the more essential function of these glands is the secretion of the oxidizing agent referred to above and known as adrenoxidase. By this term is meant a body, originating in the adrenals, which enables the blood to take up oxygen from the pulmonary alveoli and later to enable oxyhaemoglobin to exert its oxidizing power.† According to Bohm, Davidoff and Huber, in their "Text-Book of Histology," as quoted by Sajous, the capillary network of bloodvessels in the alveoli is "extremely fine" and is "sunken into the epithelium." In these capillaries the red corpuscles containing haematin meet the adrenal secretion, and as both the haematin and the adrenal secretion are reducing agents, they take up oxygen. The adrenal body has far the greater affinity for oxygen, however, and it therefore takes it through the delicate alveolar membrane and passes on to the haematin of the red blood corpuscle, which thus becomes laden with oxyhaemoglobin. The true oxidizing principle of oxyhaemoglobin is the adrenal secretion which has combined with oxygen and is known as adrenoxidase.

A number of modern writers ascribe to adrenoxidase the activity of many of the physiological ferments. To it is given credit for the action of trypsin, which is thought to

*Lewellys F. Barker, M. D. Presidential Address at the Tenth Annual Meeting of the Eugenics Research Association, held at Cold Spring Harbor, Long Island, June 10, 1922. Published in Science for June 30, 1922.

†Sajous, Chas. E. de M., M. D., etc. The Internal Secretions and the Principles of Medicine. Tenth Revised Edition, 1922. Vol. II, pp. 849-850.

be produced by the union of a substance known as trypsinogen with oxygen; the oxygen being supplied by adrenoxidase. Similarly, pepsin, ptyalin, rennin and practically all of the body ferments are thought to be the result of the union of oxygen with some mother-substance, and in each case the union is effected by means of adrenoxidase. Besides being what Sajous calls "the ferment of ferments," and putting into activity the various ferments which are essential to life, adrenoxidase is thought to be the great defensive agent against toxic substances in the blood. When there be need for such activity, the adrenals are stimulated to greater production of their secretion by the sympathetic nervous system, which in turn is dominated by the posterior lobe of the pituitary body.* This lobe Sajous calls the "test organ," deeming it the equivalent of an organ found in many of the invertebrates and some of the lowest vertebrates, whose function it is to test the water about to pass over the respiratory organs and to prevent the inhalation of noxious matters. In like manner Sajous claims that noxious matters in the blood current passing over and through the posterior lobe of the pituitary gland, cause that portion of the pituitary, which he regards as the main nucleus of the sympathetic system, to stir the adrenals to increased activity and to the production of a larger quantity of adrenoxidase to combat the toxines so detected. He thus suggests that the pituitary gland is the governing center of the body's immunizing functions, since by its detection of the various toxines which are the immediate causes of diseases, the adrenals are stirred to increased activity and a greater quantity of the oxidizing ferment is thrown into the blood current to destroy them. The rise in temperature—the fever, in other words, which attends most of the infectious diseases, is explained as the result of this increased oxidation.

Sajous ascribes many affections which have hitherto been of unknown origin, to toxines or poisons formed in the body and not destroyed because the adrenal glands fail to produce their oxidizing agent in sufficient quantities. Among these diseases is epilepsy, and he states as his own conclusion, that the main difference between the convulsions of epilepsy and those produced by the action of strychnia, or other exogenous poisons, is that the epileptic convulsions are due to poisons formed in the body and not destroyed as they should be. He further says that the main predisposing cause of idiopathic epilepsy is the tendency of many diseases, such as typhoid fever, influenza, and many of the diseases of childhood, to inhibit the function of the pituitary gland as the stimulating organ for the adrenals. He also makes the claim that syphilis, alcoholism, tuberculosis or any hereditary taint which tends to produce a general debility in the offspring, may impair the test organ's sensibility and so tend to produce epilepsy.†

The functions of the ductless glands cannot but lightly be touched upon in a single paper, and this one has reached its utmost limits. As yet, the subject has not been sufficiently explored for us to grasp its full import, but from what has been ascertained, it is apparent that the world is on the eve of some discoveries which will affect the welfare of the human race as have few products of the human intelligence. There is reason to believe that certain of the hormones influence heredity by their effects on the reproductive cells and that what used to be called the "constitution" of an organization is really the effect produced on the fertilized ovum by these hormones or other agents. Vertebrates have followed an hereditary habit of developing two eyes, one on each side of the middle line, and this habit has been followed since Devonian time, but if fertilized fish ova be allowed to develop in sea water containing an excess of magnesium chloride, this hereditary habit of long standing will succumb to environment, and monsters will be produced with a single cyclopean eye on the frontal bone. We know that the development of tadpoles into frogs may be greatly accelerated by the feeding of thyroid substance and that it may be greatly retarded by the feeding of thymus substance. We know that certain of the incretions markedly affect the dimensions and proportions of the skeleton and of the soft parts, and that certain of them greatly affect the development of the mental powers and the general vigor of the individual. With this much already ascertained, we may guess at the vast possibilities which may lie before us if we can determine the precise parts taken

*Sajous, Chas. E. de M., M. D., etc. Work cited above, Vol. II, Page 960.

†Sajous, Chas. E. de M., M. D., etc. Work cited above, Vol. II, page 1457 et seq.

by the ductless glands in heredity, and by correcting the effects of an over-supply or of an under-supply of certain incretions which cause improper development of members of the human race, we may eliminate mental, moral and physical degenerates and produce a race which will far surpass all which have preceded it.

DISCUSSION.

Dr. Kenneth Bradford, Staunton: Dr. Blackford has, I think, performed a real service. His paper has told me, and possibly others, how vastly important this subject is, and how very little we know about it up to date. I think he brought out one important fact, that the secretions of these ductless glands have a tremendously important bearing on the cause and treatment of every-day conditions that we come into contact with. Everything seems to hinge on the question of hypo- or hyper-secretion, and that, of course, has a direct bearing on body metabolism which can now be measured at once by the metabolic rate. Therefore, it is as important to find out the metabolic rate in a given case, and hypo- or hyper-secretion, as to find out whether there is too much or too little hydrochloric, or the blood pressure, or anything else bearing on it. This deals directly with the nutrition of the body. We come into contact with cases of this kind every day. We also deal with metabolism probably more than anything else in body-building, and, since we have accurate means of determining whether there is hypo- or hyper-secretion, it is our duty to make the effort to determine that fact.

PNEUMONIA IN INFANCY.*

By G. S. HARTLEY, M. D., Clifton Forge, Va.

Pneumonia in infancy and childhood is second as to causation of the high mortality in treating children, the various forms of diarrhoeal infections being considered first. A great deal is being done now to prevent the high mortality rate in severe diarrhoeal conditions, but it rests almost solely on the individual physician as a whole, as regards the number of inflammatory conditions of the lungs in childhood, as we are prone not to consider pneumonias as complications of the various infectious diseases and catarrhal conditions of the respiratory tract. I believe we can by more careful examination, energetic treatment of the condition present, and prophylaxis, prevent a great many more cases of pneumonia than we do.

In presenting a paper on this subject I have very little new to offer on any of the various phases of these conditions.

ETIOLOGY.

The etiology of the various types of pneumonia is that any pathological microorganism, especially the pneumococcus, chooses the respiratory tract as a seat of predilection for localization to produce the various forms of local or extensive inflammation where the soil has been prepared for its propagation by previous causes which favor its development, with their concurrent, systemic causes and changes.

PATHOLOGICAL ANATOMY.

The essential difference in the pathological anatomy of the two types, croupous and broncho-pneumonia, is in the distribution of the inflammation. In the bronchial type, it begins in the branchings of the trachea following some catarrhal condition of the respiratory tract and then invades the finer bronchioles and alveoli of the lung. In the croupous type, it may begin suddenly in a small or large area of lung tissue, usually in the left lower lobe, producing consolidation by means of a coagulable exudate, the result of the inflammation with or without previous catarrhal infection.

The bronchial type is the most prevalent in infants and up to two years of age and is less evident as age advances, so much so that in adults it is not common, but returns in all its virulence and mortality in the aged. The anatomical lesions which both types produce can be explained by the difference in development. Croupous pneumonia at once attacks a large or small area in one or more lobes of the lungs and with rapidity converts it into a compact airless mass while the remainder of lung tissue may remain free of invasion. Broncho-pneumonia, by following the course of the medium and small bronchi, distributes itself by the alveoli and finally to those in relation to the bronchioles already involved in the inflammation. By extensive lobular involvement it may by coalescence resemble a croupous type but still contain air. It must be admitted, however, that there is a difference in the onset and distribution of the inflammation of the two types. The inflammatory exudate is essentially the same and you can have the same pathology of the two types involving different portions of the lungs at the same time.

CAUSE OF CROUPOUS PNEUMONIA.

The croupous type advances with a continued high temperature, rapid pulse and respiration. The local conditions of the lungs

*Read before the Medical Association of the Valley of Virginia at its meeting in Clifton Forge, September 28, 1922.

remain the same, unless there is more involvement, until the crisis, which usually occurs at the end of a week, when there is usually a temporary subsidence of symptoms, again to climb back to the former level or higher in 12 to 24 hours, and then a permanent crisis. On the other hand, broncho-pneumonia shows a protracted course with a consistent but irregular variation of improvement and retrogression, the reason being that, while a portion of the consolidated lobule is undergoing involution, the inflammation is extending from a branch of the bronchial tree to other alveoli. New foci develop which cause the symptoms to again flare up; therefore, the regular course cannot occur here and the duration is indefinite. For this reason, broncho-pneumonia is much more exhausting and more fatal. These causes apply in most cases but not in all. In pneumonia in infancy, as in other diseases of childhood, there is no fast rule to be guided by without exceptions.

Symptomatology.

Croupous pneumonia, being primary, may be ushered in by vomiting, convulsions, pain in chest, rarely if ever by a chill as they are not common in children. The cheeks are fiery red, skin dry and harsh, there is increased temperature and pulse rate, with a grunting expiration, very little cough or expectoration, and no rusty sputum as this is not common in children. One of the prominent symptoms and diagnostic points is the ratio between the pulse and respiration which normally is 1 to 4, but with a respiration of 40 or 50 and a pulse of 140 to 160 the normal ratio is greatly disturbed. This sign is important in diagnosing central pneumonia. When the disease develops in the centers and spreads to the periphery in central pneumonia, physical signs are of little value. The temperature ranges between 103 and 106, pulse 120 to 170. Percussion reveals areas of consolidation with tubular breathing and increased leukocytosis from fifteen to twenty thousand or higher, and this will aid in the differentiation between pneumonia and meningitis and support the other findings. Children old enough will complain of pain in region of appendix, which is a referred pain from the pleura. Owing to the location of the pain, cases who have not been studied closely have come to operation only to find a normal appendix and a fatal termination following a marked increase in all the symptoms due to anesthesia. In broncho-pneumonia the initial symptoms are those of bronchial catarrah or bronchitis associated with increased respiration and cough which is either productive or non-productive. Dyspnoea is accompanied by cyanosis affecting face, lips and nails, if condition is extreme. As the disease progresses, the alae nasi participate in the respirations as they become more superficial and bring all the auxiliary muscles of respiration into play. The respiration varies between 50 and 60 and is jerky in character. Pulse rate is increased according to age. Temperature ranges from 104 to 105 and usually shows a morning remission of one or two degrees. Physical examination of chest in subscapular region may show moist, sibilant or sonorous rales or coarse mucous rales and at times distinct bronchial breathing, if the involvement is close to the larger tubes. Percussion shows dullness over small areas. As the disease begins to decline so do the symptoms by lysis, until temperature, respiration and pulse are near normal. The cough usually remains for sometime after symptoms subside.

Diagnosis.

If all the clinical symptoms which accompany croupous pneumonia, such as dullness on percussion, bronchial breathing, increased temperature, etc., are present, the diagnosis is easy, but they are not always present and may not develop for three or four days but the disturbed ratio between pulse and respiration, and character of respiration accompanied by cough will aid in diagnosis. One point to remember in children is that normally bronchial breathing is heard posteriorly between the scapulae; dullness is somewhat higher on the right side than the left. The diagnosis, then, rests in physical signs and findings to the exclusion of other diseases.

The initial symptoms of broncho-pneumonia show a great variance to the initial violent symptoms of croupous pneumonia. Here we have a history of prolonged catarrhal stage which precedes the actual disease, then we get the dry or moist cough, various mucous rales, bronchial breathing accompanied by a metallic sound, dullness over small areas, increased temperature, weak, fast, thready pulse, and respiration deep or shallow according to amount of secretion and previous health of child.

The prognosis in any type of pneumonia should always be guarded, no matter the pre-

existing physical condition of the child. Pneumonia complicating the infectious diseases, pertussis, diphtheria, typhoid, tuberculosis and rickets, is not favorable. Of all diseases which pneumonia complicates pertussis and diphtheria give the highest mortality. Of the two types, croupous pneumonia uncomplicated offers the most favorable prognosis. Type 3 infection is the most fatal. As stated, we can reasonably expect a favorable outcome in children who were previously healthy and who have a limited extension of disease. Still, the most severe infection often gives a good prognosis. Nurslings offer a better chance than those artifically fed. Children in foundling asylums, crowded quarters and those who have poor care offer very little in prognosis.

Treatment.

In treating pneumonia, the old outline of treatment—hygienic, dietetic, medicinal, etc.,—has to be gotten away from and the indications met as they arise. We have not as yet a specific treatment but in a measure a specific remedy that can help a great deal and to which I will refer later. Croupous pneumonia being a self limited disease, we are at a loss somewhat to know what to do for it sometimes. We cannot abort the disease or curtail its extension, as a certain number of cases will get well without any treatment; but there are certain conditions we have to meet. In the first place, when the diagnosis has been made, we should disturb the patient as little as possible by examinations and handling. A good nurse is the most essential adjunct. There should be warm mustard baths, liquid diet, daily evacuation of bowels, ice or mustard to chest for pain, a close watch on pulse and temperature, and, above all, a good night's rest, if it has to be secured by an opiate, codeine phosphate being the best. If the heart needs stimulating, caffeine sodium benzoate or camphor in oil can be employed. If the pulse is rapid, tinct. strophanthus is the drug of choice in children as it can be given over a period of time without deranging the stomach.

In regard to specific treatment I would like to mention one and that is Rosenow's Pneumococcic Antigen, given in proper dose for age and repeated until you see a change in symptoms for the better, usually after 24 to 48 hours. There will be a drop in temperature and pulse rate and the general appearance of the patient will be better. I have been using this antigen for the last three years in all forms of pneumonia and reasonably believe it a valuable adjunct.

What has been said in regard to the treatment of croupous pneumonia applies in a measure to broncho-pneumonia but in this type we have to be more aggressive for it is usually complicating other diseases and usually found in debilitated subjects. We have to deal with the cough and secretions of the lungs, which is most troublesome. The child has to have more supportive measures and closer attention. If the cough is tight, the croup tent offers one of the best measures for infants, combined with Liquor Ammonium Anisatis often repeated. If the cough is excessive in occurrence and secretion and if the child's general condition will admit, an emetic to get rid of secretions is indicated but should not be repeated during 24 hours. For high temperature, a warm mustard bath followed by an alcohol rub will be of benefit. If pulse is weak and thready, caffeine sodium benzoate can be relied on. In desperate cases with massive involvement, high temperature, bad pulse and cyanosis, more drastic treatment is required by stimulants. If secretions are excessive, the child should be upon a back rest as it can breathe better. Brandy in some form should be combined with Liquor Ammonium Anisatis every hour. Hot mustard baths and hot packs should be used to keep up the peripheral circulation and relieve the engorged lung and remove secretions. If heat is of no avail, covering the chest both anterior and posterior with dry cups will sometimes tide the patient over.

There are a great many other measures advocated which have their place in treatment, but I have found the above outline, modified to suit the conditions present, to have given me the best results.

Discussion.

Dr. Chas. E. Conrad, Harrisonburg: There is nothing special that I see fit to bring up except that auscultation is of little value in the so-called central pneumonia in making out the pneumonia process. This is probably a peripheral pneumonia instead of central pneumonia, and no physical signs are found on auscultation because the involved area does not come into connection with the hilus, and, therefore, no signs appear, it being a peripheral condition instead of a central one.

As Dr. Hartley stated, it is of importance in pneumonia of small children, to go over the chest very thoroughly, and eliminate any condition in which a question of appendicitis comes up, as that certainly does simulate it very closely. Fortunately, in chil-

dren, type four pneumonia is the one most frequently found, and type four, also fortunately, is the least fatal; consequently, it plays a very important part in the prognosis.

There is also a question of one other thing in the treatment: In the treatment of small children, especially under two years of age, we should pay a great deal of attention to the digestive tract, instead of all our attention to the lung condition. If digestion and nutrition are kept up it is very much in favor of a good prognosis in pneumonia of young children.

DR. WALTER COX, Winchester: Some time ago I heard a very interesting paper by Lord, of Boston, on the causes of crisis in croupous pneumonia. Looking along the lines of chemistry, it was found that the different types of pneumococci produced a substance which could be recognized by the hydrogen ion concentration. It was found that when hydrogen ion concentration reached 5.3, it marked the crisis. Delayed crisis was due to absence of this material. The death of the pneumococcus at the crisis produced an enzyme which liquefied the solid material in the alveoli and caused easy absorption and resolution. It was an interesting paper, but nothing of practical interest has been evolved so far as I know. I have thought of it ever since in cases of pneumonia, and wondered if anyone had seen anything which suggested an application of Lord's discovery and work.

PEPTIC ULCER*

By J. A. RIFFE, M. D., Covington, Va.

Gastric and duodenal ulcers are essentially alike in their etiology, symptoms, and treatment. Whatever differences exist are due to the complications which may arise as a result of the difference in their location. Therefore, the general term peptic ulcer is used to cover the ulcers found in both the stomach and duodenum.

ETIOLOGY.—The etiology of gastric and duodenal ulcers has not been satisfactorily proven in all details. No doubt many factors enter into their production. Two factors have been pretty generally recognized:—(1) circumscribed malnutrition or necrosis involving the mucous membrane or walls of the stomach and that portion of the duodenum subjected to the digestive action of the gastric juice; (2) the digestive action of the gastric juice.

Clinical observation and post-mortem study, with extensive experimental work have furnished the grounds for the general belief that the initial factor in the formation of ulcer, local malnutrition, or necrosis, may be the result of many causes. Practically all these causes are the result of changes in the blood or blood vessels supplying the part. It is also believed that such local defects which are the result of malnutrition or necrosis would always undergo rapid repair were it not for the eroding influence of the gastric juice. It is significant that duodenal ulcers are located within one and one-half inches of the pyloric orifice. The duodenal bulb retains the gastric juice longer than any other portion of the duodenum. Only within this neutralizing field of the duodenum can an ulcer occur. Virchow in 1885 emphasized the importance of the role played by the blood vessels in the production of ulcer. Taking this as a working basis, experimental work and post-mortem studies show that thrombosis and embolism of the arterial twigs supplying the mucous membrane of the stomach and the upper part of the doudenum result in local malnutrition or actual necrosis. Experimental ulcers have been produced in lower animals by many methods. In many cases the agent employed has produced death of the tissue; ulceration was a natural sequence. The digestive action of the gastric juice hastened the disintegration of the slough. In some of the methods the vitality of the tissue exposed to the action of the gastric juice simply has been impaired. This has been accomplished by changing the quality of the circulating blood, by reducing the quantity of normal blood supplying the part, and by introducing poisons into the circulation that have a selective action on the cells of the mucous membrane exposed to the action of the gastric juice. A great many poisons introduced intravenously produce acute ulcers of the stomach and duodenum. It has been demonstrated that actual necrosis is not necessary as an antecedent to the digestive action of the gastric juice. It is only necessary for the cells to be damaged to a certain extent. It is believed that hydrochloric acid in the strength found in hyper-acid stomachs may act as a protoplasmic poison to cells already damaged and thus under certain conditions hyperchlorhydia may add to the devitalization of tissue and render it more susceptible to the digestive action of the gastric juice.

Before the discovery of microorganisms it was observed at autopsy that acute ulcers of the stomach and duodenum frequently occurred in pyemia and less frequently in many of the acute infections. In 1857 Lebert injected pus intravenously and produced acute ulcers of the stomach and duodenum. Soon after the discovery of microorganisms cultures of various bacteria were injected intravenously and thus it was found out that acute ulcers of the stomach and duodenum could be

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produced by embolic bacterial invasion. For a good many years it has been observed that now and then the onset of ulcer symptoms seems to coincide with the development of an acute alveolar abscess, tonsillitis, or some other acute infection.

The intensive study of focal infections led to the discovery through animal experimentation that streptococci, irrespective of their source, when of a certain virulence, exhibit affinity for the gastric mucous membrane.

The tendency of all ulcers produced experimentally to heal rapidly has been known for many years. As yet experiments on lower animals have not wholly succeeded in producing typical chronic ulcers such as occur in man. Assuming that embolic bacterial invasion is the cause of local malnutrition or necrosis in many cases of acute ulcer in man, it would seem probable that the condition for healing might be so adverse at times as to cause the ulcer to become chronic. According to Rosenow and others, chronic ulcers contain few bacteria. All the evidence accumulated tends to substantiate the belief that ulcers of the stomach or duodenum would heal as rapidly as an ulcer elsewhere if it is not subjected to the digestive action of the gastric juice.

Morbid Anatomy.—It is significant that gastric and duodenal ulcers occur only where the tissues of these structures are exposed to the digestive action of the gastric juice, namely the pyloric end of stomach and extreme upper end of duodenum and are usually single.

Ulcers of the stomach vary in size from that of a pinhead to ulcerated surface involving the greater part of the organ.

Ulcers in both organs may be superficial, involving only the mucous membrane and submucous tissue. Or they may extend into the deeper layers involving the muscle layer or even the peritoneal coat. A deep ulcer may perforate into the peritoneal cavity. More frequently the peritoneal surface becomes adherent to the surrounding structures. Perigastric and periduodenal infection may result in a local abscess which is usually subdiaphragmatic in location. Stenosis of the pyloric outlet is one of unfortunate results of cicatrization of ulcer in that locality. The stomach may be deformed following healing as a result of scar formation.

Symptoms.—A gastric or duodenal ulcer may be present without causing sufficient trouble to arouse the attention of the affected individual. The presence or absence of subjective symptoms depends largely on the irritability or sensitiveness of the nerves or neuromuscular structures related to the ulcer. When peptic ulcer is associated with the conditions essential to the production of clinical manifestations, subjective symptoms are often present in such a typical form that a diagnosis may be made from the clinical history alone. It is very important to obtain a detailed account of the distress symptoms as they appear during a typical 24-hour period.

Upon careful questioning the patient, it will be found that when eating the usual three meals daily, the symptoms are likely to be as follows: In the morning before breakfast, the stomach being empty, the patient is free from distress. During the meal and immediately after there is no distress. If the symptoms are mild there may be no distress during the forenoon. If it does appear it is usually between 9 and 11 o'clock. As a rule, it gradually increases until it reaches its height, then gradually subsides as the stomach empties itself before the noon meal. If an excessive quantity of food and secretion is retained until the noon meal the distress may continue until relief is obtained by eating. If distress appears during the afternoon it is usually between 1 and 3 o'clock. Rarely does it appear as late as 4 hours after eating. The distress is likely to increase until it reaches its maximum intensity and then to continue as a steady or fluctuating distress until it grows less and disappears before supper. If a quantity of food and secretion is retained, the distress may continue until relief is obtained by eating supper. Unless a very light meal is taken at noon the distress is always greater in the afternoon than in the forenoon. Immediately after supper there is no distress. If the patient remains quiet during the evening there may not be any further distress. The more severe the distress in the afternoon and the longer it lasts, the greater likelihood of a return in the evening. If distress does return in the evening it is usually in from 1 to 3 hours after supper. In such cases the patient usually learns to take soda or a glass of milk before going to bed.

The symptoms thus described from morning until bed time may be a result of either gastric or duodenal ulcer. The more severe and prolonged the distress and the more regu-

lar its daily occurrence, the greater the probability that the ulcer is associated with pyloric obstruction and retention. When the stomach is normally empty the irritant is not present and the pain ceases.

In addition to the daytime symptoms as described, which are common to both the obstructive and non-obstructive type of ulcer, the patient with pyloric obstruction may complain that now and then, or perhaps regularly, he is awakened between 12 and 2 o'clock at night with similar pain. Pyloric obstruction complicating peptic ulcer is likely to be attended by another complication, namely, excessive gastric secretion. This secretion appearing in large quantity in the stomach after the greater part or all of the food has been expelled, remains largely uncombined. The degree of free HCl is usually at its maximum and the distress or pain is often the greatest experienced during the 24 hours. Because of the great pain the patient usually learns to provide himself with soda or milk which he may take when awakened by the night distress. The distress may cause vomiting, the vomiting usually brings relief. The amount of vomitus varies from a half pint to a quart. The amount of food contained in the vomitus is small. Now and then the relief obtained is temporary and distress soon starts up again. Relief may be obtained as before. Even though none of the relief measures have been employed, the distress may gradually disappear spontaneously in from one-half to three hours, or it may continue until morning to be relieved by breakfast. The spontaneous disappearance of the distress is caused by the gradual emptying of the stomach of the food and irritating secretion. When the distress continues until morning and is relieved temporarily by breakfast, it is probable that an excessive continued secretion with or without food has been retained all night. If the distress is pronounced, the fluid is usually rich in free HCl. Plainly visible peristaltic waves, lifting up the wall of the abdomen, passing from left to right and confined to the location of the stomach, are diagnostic of pyloric obstruction. In the absence of obstruction, the symptoms of gastric or duodenal ulcer seldom continue until midnight.

The clinical manifestations described are likely to vary in intensity from day to day and from week to week. There is a great tendency for the clinical manifestations to occur in attacks which vary in duration from a few days to several weeks or months. Many patients give histories indicating that an open ulcer has been present continuously for two or more years. It is not rare for patients to give a history of recurrent ulcer that has been present from 10 to 15 years.

When peptic ulcer is giving rise to clinical manifestations, the most constant and usually most important diagnostic symptom is epigastric distress. This distress varies from a slight discomfort to the most intense pain and this is often attended by epigastric depression or nausea. The distress or pain is usually limited to a small circumscribed area, whether peptic or duodenal. The most frequent seat of the distress is some where near the median line between the umbilicus and ensiform. Now and then it radiates to the back. Corresponding to the position of the circumscribed pain tenderness on pressure is usually present. This is not always constant. Vomiting is seldom a prominent feature. It occurs in less than half the cases. The vomiting of blood in connection with other signs and symptoms of ulcer constitutes one of the most positive symptoms of ulcer. This occurs in less than 10 per cent. of all cases. The infrequency of hematemesis as a symptom of ulcer is not an index to the frequency with which bleeding occurs. A certain amount of oozing occurs in a large per cent. of cases. If the bleeding is sufficient, cachexia may be present. The appetite is usually good. The patient often eats less than normal because of the fear of pain.

After an Ewald test breakfast, removed in an hour and titrated with a decinormal sodium hydrate solution, we get the following results:

In fifty per cent of cases hyperchlorhydria exists; the total acidity ranges from 60 to 120; free HCl from 40 to 100.

In slightly more than 40 per cent. of cases the acidity is within the normal; total acidity 40 to 60; free HCl 20 to 40.

In less than 10 per cent of cases the acidity is less than normal; total acidity less than 40; free HCl less than 20.

When the microscope reveals sarcinae or budding yeast cells in abundance, a retention of food over night has existed in successive days, for weeks or longer.

Bright red blood seen in streaks in the contents should be disregarded. Chemical tests

for blood may be used with caution. The absence of occult blood in the contents does not exclude ulcer.

Except when a large hemorrhage has taken place, visible blood is not present in the stool. Occult blood is not present in all cases of ulcer. There is nothing distinctive about the blood findings in the ulcer. If the patient has suffered large and repeated hemorrhages, there will naturally be a secondary anaemia.

Diagnosis.—Post-mortem statistics show that an open or healed peptic ulcer is present in 5 per cent of all adults dying from various causes. It should be remembered that in the absence of cancer or ulcer and their complications, real distress or pain is seldom attributable to a disorder of the stomach. Unquestionable general development of skill in the diagnosis of ulcer is greatly inhibited by such teaching as tends to belittle the value of accurate clinical signs and symptoms of ulcer and by unduly magnifying the value of the type of Roentgen ray examinations in most cases. It would be most helpful if we would realize that the most conclusive evidence of the existence of an unhealed ulcer is invariably to be derived from a careful study of the distress symptoms which lead our patients to seek medical relief. Careful observation is our greatest ally in making an accurate diagnosis of this malady.

A diagnosis of peptic ulcer should involve a careful study of its probable location, duration and complications. A search should be made in every case for evidence of the following complications:—(a) Pyloric obstruction; (b) Excessive continued secretion; (c) Perigastritis; (d) Perforation; (e) Perigastric adhesions; (f) Hourglass or other deformity; (g) Hemorrhage.

Very often a carefully obtained history together with such signs as may be disclosed at the first examination, reveals reasonably conclusive evidence regarding all the more important points as enumerated. This should be coupled with a thorough physical examination, chemical and microscopic analysis of stomach and bowel contents, an examination of the urine and blood. If after this has been gone through with we are still in doubt, a period of observation is often helpful. With rare exceptions the Roentgen ray investigations should follow rather than precede the accurate study of the subjective symptoms and such other signs of disease as are present. Roentgen ray evidence is of two types (1) direct, (2) indirect or contributory.

Direct Evidence.—The crater of a penetrating ulcer may be seen provided it is sufficiently deep and located where the projection or niche may be seen.

Indirect Evidence.—A spasmodic contraction of the circular muscle fibers producing a sharp indentation, usually on the greater curvature, may be found opposite an ulcer or scar.

Treatment.—Before starting treatment in a case of gastric or duodenal ulcer, a careful study of the conditions that attend the ulcer, its probable location, duration and complications should be made with a view of determining whether the cause is one for medical or surgical treatment. The following are the indications for surgery: (1) The development of carcinoma at the seat of the ulcer; (2) Perforation into the abdominal cavity; (3) Pyloric obstruction of such a degree as to interfere with medical treatment; (4) Perigastric abscess; (5) Hour-glass contraction; (6) Dangerous hemorrhage; (7) Foci of infection about teeth, tonsils and elsewhere should be removed.

Medical Treatment.—It having been pretty definitely worked out that a peptic ulcer would heal as readily as an ulcer situated any where else about the human body, if it were not for the digestive action of the gastric juice, medical treatment in order to be logical should have for its object the protection of the ulcer from this disintegrating action of the gastric juice by destroying this action over a period of time sufficiently long to allow the ulcer to heal. For a great many years it has been known that the digestive action of the gastric juice is due to the solvent action to pepsin in albuminous substances in an acid media. Pepsin is practically inert in alkaline and neutral media. A free acid such as HCl is required to permeate the albumin and prepare it for the action of the peptic ferment. By rendering the gastric juice alkaline or neutral and keeping it that way, we are able to make conditions such that the eroding action of the gastric juice is destroyed and as a result the ulcer will heal naturally. A brief outline of the treatment as outlined by Sippy is as follows:

Three ounces of a mixture of equal parts of

milk and cream are given every hour from 7 A. M. to 7 P. M. After a day or two a soft egg with crackers or bread and butter may be added to one of the forenoon feedings. Three ounces of a cereal, such as well cooked rice or oatmeal, may be added to one of the afternoon feedings. Gradually egg and cereal are added until at the end of the first week the patient is taking three ounces of the milk and cream mixture every hour from 7 A. M. to 7 P. M. and in addition is taking three soft eggs and 9 ounces of cereal; custards, cream soups, vegetable purees and other soft palatable foods may be a substitute for the milk and now and then jellies and marmalades may be gradually added if desired. In cases of peptic ulcer unassociated with stagnation of food, the free acidity is usually controlled by giving a powder every hour containing 10 grains each of heavy calcined magnesia and sodium bicarbonate, alternating with a powder containing 10 grains of calcium carbonate and 30 grains of sodium carbonate, midway between feedings. In addition the powders should be given every half hour after the last feeding until 4 or 5 doses are taken. The powder is stirred in half a glass of water immediately before taking. If diarrhea develops, the calcium carbonate and soda powders should be substituted a sufficient number of times for the magnesia and soda powders. If constipation develops, a reverse substitution is required. At the beginning of the fourth week, three small meals are instituted with 3 ounce feedings of cream and milk between. The powders should be given every half hour for three or four doses, after each meal. This should be kept up until we are sure the ulcer has healed,—that is until the patient has been free from pain or distress over a long period of time while on a liberal diet. The treatment of peptic ulcer with obstruction is the same in principle as that described, except in addition it is often necessary to give larger doses of alkali and to empty the stomach each night with a tube about a half hour after the last powder; and if the condition is exaggerated, it may be necessary to empty the stomach again at midnight, thus removing the greatest stimulus to an excessive night secretion.

DISCUSSION.

DR. A. L. TYNES, Staunton: I just want to make two or three remarks on this very interesting paper: One regarding the use of alkalies as a diagnostic point. I believe that I can safely say that it has been the experience of most of us in the treatment of gastric pain which we suspect to be due to peptic ulcer, if we give alkalies in sufficient quantity and we do not get relief in twenty-four or thirty-six hours, we had better consider revising our diagnosis.

As to the use of alkalies in hemorrhage: In the presence of occult blood we should normally expect administration of alkalies to control the hemorrhagic condition within forty-eight hours.

The use of alkalies as a post-operative therapeutic measure, I think, is one of the most recent advances in the treatment of this disease. In the conditions where alkali treatment has been given, practically the same alkali medications and the same diet as was used prior to operation should follow all operations for gastric ulcer.

CONGENITAL HYPERTROPHIC PYLORIC STENOSIS.*

By J. M. EMMETT, M. D., Clifton Forge, Va.
Chief of Staff, Chespeake and Ohio Hospital.

It seems to me that the literature on this subject has been too closely allied with the advances in surgical technique to be of any real value to the general practitioner, and it is the general man who is called upon to determine the course of these patients. I am, of course, interested in the surgical side but I shall try to limit my remarks principally to the medical and diagnostic technique.

The condition of congenital hypertrophic pyloric stenosis received its identity from Dr. Wm. Osler in 1903. Since that time each year has seen an increasing number of reported cases. Correlation of cases in 1914 showed that more than 1,000 had been reported. Today every clinic has its series under development.

The condition often occurs in the first baby, although it may occur in later children. The large percentage of reported cases has been in breast-fed children. The earliest case occurred in a four-day-old infant, the latest case in an infant seven weeks old. It is said that it never occurs after the ninth week but I should like to amend this statement by saying that it does not occur as a complete obstruction after nine weeks, although mild pyloric hypertrophy has been observed in later life during the course of upper abdominal explorations.

The cause of congenital pyloric stenosis is not well established. Probably Downes' explanation of edema caused by circulatory disturbances resulting from increased peristalsis trying to force gastric contents through the narrowed pyloric lumen is the most practical.

The symptoms may be classical or varied.

*Read at the meeting of the Medical Association of the Valley of Virginia in Clifton Forge, September 28, 1922.

XUM

The typical case shows an infant a few days or a few weeks old, normal until the present attack, who begins to vomit without any apparent cause, the vomiting occurring during or immediately after eating, and it is usually explosive in character, often being expelled several inches from patient's mouth. At first, the vomitus is the ordinary nourishment which the patient has taken. Frequently one or more feedings may be retained only to be lost later. After the spasm of vomiting has ceased, the baby is left hungry. The babies are constipated, they often have frequent small stools with little or no fecal matter, only a slight yellow stain. The degree of constipation depends upon the completeness of the pyloric occlusion. The babies void very scantily, due to the dehydration. Emaciation occurs very rapidly and, if the obstruction is complete, death ensues without much delay, although the cases of partial blocking may linger on for weeks. Examination in the early stages may not show very definite symptoms but as the disease progresses a fullness in the upper abdomen with a definite peristaltic wave beginning on the left side and extending along the course of the stomach and ending just to the right and slightly above the umbilicus is observed. This peristaltic wave is best observed immediately after eating, or during the course of the feeding. The real diagnostic point though occurs in being able to palpate a small tumor over the pyloric end of the stomach. This tumor is about the size of an olive and it is usually located in the mid-line between the umbilicus and ensiform cartilage, although occasionally it is high up under the ribs on the right side, and such a position makes definite palpation difficult. The tumor feels hard and dense although it is freely movable. One can best locate the tumor when the stomach is empty. Some observers have advocated the administration of a mild anesthetic for the examination of the tumor when it is difficult to locate, but I do not think such a procedure is well warranted. The one condition that has mixed us up on this diagnosis is pylorospasm. A great many authorities condemn the identity of a true pylorospasm; however, I, myself, have observed cases that gave some of the classical symptoms of pyloric stenosis and I watched these cases operated upon only to find no tumor present. Later, under medical treatment, they were cured. Such a failure to find pathology has gotten surgical intervention in disrepute among certain good men. In any infant between the ages of four days and seven weeks who starts vomiting without a cause, and who has been previously well and developing rapid emaciation and obstinate constipation, a careful observation and investigation is worth while. In 1912 Hiss described the use of Nelaton's catheters to determine the size of the lumen in the pylorus. This method will clear up for you the diagnosis between pylorospasm and congenital stenosis. With a baby well fastened in a sheet and held in an upright position no difficulty is encountered in passing a 14 Nelaton's catheter through the stomach into the pylorus. Of course in the true stenosis cases it is impossible to get the catheter into the pylorus. Strauss of Chicago has advocated the use of the fluoroscope following bismuth meals. He says that the peculiar snake-like contractions observed in the pylorus and not in other regions of the stomach are definite. This, of course, can only be done when the doctor has access to the X-ray. I do not consider it a very important diagnostic agent anyway.

I believe that all of these patients, if they are recognized early, should be treated medically first. The contributions along non-surgical lines have been very gratifying. The thick cereals with atropine, beginning 1-1,000 solution and gradually increasing the amount of the atropine, have gained a very definite place in the treatment of this condition. Of course, the condition is potentially surgical and, if the baby shows signs of losing ground, surgical treatment should be instituted. Whenever a baby shows a 20% loss of weight surgical treatment should be sought.

The pathology at autopsy shows a hyperplasia of the circular muscular fibers of the pylorus. The longitudinal fibers are involved to a lesser extent. The thickening is at times so great as to completely occlude the lumen of the pylorus and is more marked at the duodenal end.

H. Leslie Moore has recently reported a case of congenital pyloric stenosis complicated with pylorospasm. It occurs to me that if our reasoning is correct then all cases of stenosis must be complicated with pylorospasm, some probably more decidedly than others. I feel sure that a great many of these patients have been operated upon unnecessarily, but I

am equally convinced that a careful painstaking observation will save many children that we have previously lost from what we termed dietary disturbances.

The surgery of this condition is rather simple. Since Downes popularized the Rammstedt operation a few years ago the operative mortality has been appreciably lowered.

I feel that the question of hemorrhage following this operation has not been quite decidedly enough stressed. I have seen one fatal hemorrhage occur following the Rammstedt operation. Although it was not determined what part started bleeding first, I am convinced that the primary hemorrhage was in the pyloric incision and later from the abdominal incision, the latter resulting from a general disturbance of the blood-forming system. Although I have not tried it I feel that the Strauss modification of the Rammstedt operation is probably worth while and will lessen this tendency to hemorrhage. The nutrition of these patients is frequently bad and we often observe sloughing sluggish wounds. I feel that the wise course in these patients would be to make your incision high up over the edge of the liver in order that you would have to retract the lower edge of the liver to get in the peritoneal cavity. The tumor should be hooked up with the index finger and operation on the pylorus done. When completed the stomach is dropped back in the belly-cavity. The liver returns to the former site creating a degree of pressure against the abdominal wall and also preventing a future hernia. There are certain principles that must be observed in operating upon infants. They should be kept warm with hot water bags on the table, the instruments should be small and well chosen. Babies do not stand the loss of blood, neither do they stand a long deep anesthetic. Babies under one month of age are very readily operated upon without any anesthetic at all. As soon as practical after operation, feeding should begin and arrangements for fluid intake must be allowed for.

Summary.

1. Any child a few days or a few weeks old who begins vomiting without any apparent cause should be kept under observation.

2. Constipation, rapid emaciation, decreased urine output with the definite peristaltic wave observed over region of stomach are suggestions of congenital hypertrophic stenosis or pylorospasm.

3. The question of pylorospasm can be cleared up by the fact of being able to palpate a definite tumor or by the passing of a number 14 Nelaton's catheter. No difficulty is encountered in passing this instrument in the cases of pylorospasm whereas the obstructed pylorus will not admit of the catheter in the stenosis cases.

4. Medical treatment should be tried in all cases when they are found sufficiently early. However, when a 20% loss of weight is observed, surgical methods should be resorted to.

5. The surgery of infants requires special instruments, carefully selected.*

Discussion.

Dr. P. W. Boyd, Winchester: It has been my good fortune to see but one case operated upon, and I think many cases respond to medical treatment, and that this should be tried out thoroughly before resorting to surgical means. Dr. L. W. Sauer of Evansville, Indiana, reported thirty-five cases of pyloric stenosis, twenty-eight of which were treated by thick gruel feeding. I believe, of the twenty-eight cases, twenty-four responded to this treatment.

As you know, the recognized authorities agree that the Rammstedt operation is the more practicable of the two. Even in this we are liable to have some complications. In one case operated upon by Dr. E. C. Stuart at Memorial Hospital, the tumor was palpable, and when the abdomen was opened the tumor was much larger than one would expect. The operation was very skillfully done. During the procedure, when the muscles were divided sufficiently, we could hear a slight bubbling of air. The thought occurred to him to cover the gap made by dividing the muscles, with a flap of peritoneum. This was evidently very successful as the child recovered promptly, the convalescence was uninterrupted, and there was no vomiting after the operation. I believe this would prevent many accidents if we put an omental patch over the muscle which has been divided as a good many post-operative accidents seem to occur.

Thick gruel feeding should be tried out before operating. The preparation of the gruel is very important. It is made from about four ounces of milk, twelve ounces of water, and two and one-half ounces of barley or rice flour. It should be boiled until its consistency is such that it will stick to the spoon when held up. Then feed it by pressing it in the mouth by a spatula. It is very troublesome, and requires a good deal of care in the administration of the food. It is often retained and the patient relieved. It is to be used in post-operative cases as well as those which do not require operation.

Dr. Kenneth Bradford, Staunton: I had one of these cases in a baby of six weeks which presented all the classical signs and symptoms. It was impossible to do the Rammstedt operation, so gastro-enterostomy was done with uneventful recovery. General practitioners should know well the early symptoms, because they can be easily confused with vomiting from indigestion and soon become poor surgical risks.

*Four cases were reported in detail, one of which was taken from the records of Dr. C. C. Coleman, of Richmond.

It occurs in breast-fed babies almost altogether, and it nearly always occurs in the early weeks.

DR. R. P. BELL, Staunton: One of my reasons for coming today was to see how many cases Dr. Emmett would report. I was curious to know whether there were many more in this community than in Staunton. I have only seen one case in Staunton. Seeing reports of rather large numbers of cases coming from other places, I wondered if we were diagnosing it incorrectly at home, or if it did not exist. There has been only one baby in thirteen years in our community to have it. We have had vomiting infants, of course, but all cleared up without operation. This was a case of complete stenosis. It is the only one operated on by me. After I got in the abdomen, what impressed me was the hard brawny feel of that pylorus, more like a wooden spool than anything I can think of. I could feel the depression in the duodenal end, but there was absolutely no passage way. The line of junction between the edematous and soft tissue was sharp. I attempted to do a Rammstedt on the pylorus, and made an opening in the mucosa. I did not think of a gräft, but patched up the hole, and then did a gastro-enterostomy, fearing to trust the Rammstedt. The child got along all right.

DR. C. E. CONRAD, Harrisonburg: Most of these cases are seen about the third week and come to operation the fourth or eighth week. At Babies' Hospital, New York, I saw post mortem specimens from two days to two years after operation, showing the results after operation. At careful autopsy two years after, you could see nothing but a hair line, and the pylorus seemed the same as would be expected except for the hair line where the two ends had come together. The specimens at two days, three weeks, six months, and two years, showed the repair nicely, and I was in hopes of getting more definite information, but could not find the magazine the report was in. It was very interesting to see these autopsy specimens.

At the Babies' Hospital they are much slower in putting the cases to breast. Four c.c. of breast milk and four c.c. of barley water are given every three hours, and increased every other feeding by four c.c. of breast milk until thirty c.c. are being given. The cases are not put to breast until five days after operation, and only for one feeding, gradually working up. They use heat to support body temperature, and clysis to take care of the fluid end. They got good results in nearly all cases operated on.

DR. J. M. EMMETT, Clifton Forge, closing discussion: I think I have answered Dr. Bell's question concerning the frequency of these cases in our community. One of the cases I reported was Dr. C. C. Coleman's of Richmond. I was associated with Dr. Coleman at the time this case was handled and I have reported it because of the unusual termination.

In reference to the 28 cases of definite pyloric stenosis with a permanent cure of 22 under medical treatment which Dr. Boyd has just mentioned. I doubt very much if these 28 cases were all true hypertrophic pyloric stenosis. It would be quite easy to include in such a series cases of pylorospasm. I feel that a great many cases with symptoms of pyloric stenosis respond to medical treatment but I doubt very much if true hypertrophic pyloric stenosis ever responds to any treatment except operative. A definite diagnosis can only be established by tubes or fluoroscopic examinations. Dr. Wm. Downes, of New York, says that no case with a definite palpable tumor ever responds to medical treatment. The administration of atropine may control the pylorospasm associated with these cases, but I don't believe that it will materially improve the hypertrophic changes which are already present.

In answer to the question about early feeding. I wish to say that I know nothing about the feeding of infants; that end of the treatment is left entirely to our medical men. My records show that my cases were all fed early and from my small series of cases I cannot see that any material disadvantage has followed this method. Only one of our cases died but this was due to a hemorrhage which I think began primarily in the pyloric incision, and later was associated with general hemorrhage, due probably to some interference with the general blood forming system. No coagulation time has been taken on any of our patients and I have considerable doubt as to the coagulation time before operations anyway.

THE PRACTICE OF MEDICINE FOR FORTY YEARS.*

By W. H. F. MILLER, M. D., Clifton Forge, Va.

In selecting the past forty years as a topic for discussing the advance in medical science, I know that what I shall say will not be new to the older members of this society, but, if nothing more, it may be of interest to the younger ones.

I have selected this period for two reasons. First: it is the time in which I have served my apprenticeship in the domain of the healing art. Secondly: although medicine has been continuously progressive from the earliest recorded times, the past forty years have been so prolific in such startling, varied and beneficial progress that it may well be placed in the forefront of all other periods.

Among the more important innovations which we older members of the profession have witnessed is the interest taken in better medical education. In 1882, with one or two exceptions, the medical colleges of the country required only two sessions of six months each, in which a student was expected to graduate. Some schools curtailed this to two sessions of five months each and it was possible, in one school at least, to complete the course in nine months. Not only this, but the country was infested with bogus colleges, many of which would furnish a certificate of graduation without other qualification than paying a fee. No legal prerequisites were demanded in most of the states.

During the early seventies a few states began examining those who wished to take out a license. This movement gained rapid headway until in the eighties most of the states followed suit. Virginia began examining in 1885. The result was that many men were found deficient and denied a license. This

*Read before the Medical Association of the Valley of Virginia at its meeting in Clifton Forge, September 28, 1922.

procedure resulted in lengthening the course of study to three and four years as we have it at present.

The past four decades have been prolific in what we may call independent investigation, made possible by the many donations and bequests, some of them of enormous sums, given solely for this purpose. The result of these philanthropies has been of inestimable benefit to the profession at large and to humanity in general. The especially trained laboratory workers have by their untiring devotion to their work made so many discoveries that but few of them can be mentioned here, but we may enumerate especially the hookworm campaign of the Rockefeller Institute, which has reclaimed thousands in our own country from lives of mental and physical deficiency. I would say, in parenthesis, that one-half of the world is in the so-called hookworm belt. The cause of yellow fever has been discovered and the stegomyia mosquito convicted of being the medium of transmission, through the patient research of Gorgas and Noguchi. It is through their work that this dread disease, which yearly decimated the tropical regions of Central and South America, has literally been abolished from the face of the earth. Malaria has been so effectually brought under control that the areas in which it has always been endemic have been reduced by one-half.

Governmental, State and National supervision of health, unknown thirty years ago, has accomplished even more than was hoped from it in the beginning, as evidenced by the amelioration in typhoid, diphtheria, smallpox, tuberculosis and kindred diseases.

Although bacteria had been discovered many years before the period under discussion, their significance was not fully realized until later. The years 1884-5 may well be termed the red letter days in bacterial discovery and its elaboration into a definite science, for in 1884 Koch discovered the comma bacillus of Asiatic cholera and in the same year Klebs and Loeffler, working independently, proclaimed the isolation of the bacillus of diphtheria, which henceforth was known by their names. In the same year pus organisms were differentiated and classified. Tetanus bacilli were discovered in 1885 by Nicolaier and their biological characteristics described by Kitasato. In 1892 the same Japanese investigator succeeded in isolating the baccillus of bubonic plague. From these beginnings we may trace the discovery of many other micro-organisms and as a sequel the anitoxins' beginning with that of Behring's diphtheria antitoxin. The phagocytic properties of the leucocytes was recognized by Metchnikof in 1886.

Later on came the bacterial vaccines. Mention may be made especially of the typhoid vaccine which has rendered that scourge, which in modern warfare was wont to kill more than the enemy's bullets, negligible compared to what it was before 1900.

Hence, we can see that the past forty years has been the era in which the etiologic, prophylactic and therapeutic value of bacteria has come to be recognized.

In the early eighties Lister promulgated his antiseptic theories which were generally accepted, especially in this country. It is interesting to quote Bryant, then one of the leading surgeons of the world and an acknowledged authority, as late as 1885. In writing on ovariotomy and the removal of the uterus to hasten the cessation of menstruation he says: "The wonderful success of Keith and others, believing in the methods of Lister, convinces me that all surgeons should give the patient the benefit of the doubt. We may not believe in it but no one has proved that it increases the mortality." The mortality in removal of the undiseased ovary was 22.06 per cent.; what must it have been in cases of infected tubes and ovaries? The same writer states that removal of the uterus should under no circumstances be undertaken until the size of the tumor is such as to endanger life or to render existence unbearable. Before Lister's discoveries surgeons were loth to open the abdomen save as a last resort, except in the case of traumatism. Lister's antiseptic methods were the foundation stones on which modern asepsis was built and familiarity with the pus forming organisms was the chief factor which led to the elaborate aseptic technique in vogue at the present day.

With all the cavities of the body invaded, without having the angel of death hovering over with fluttering wings, surgery took on new life and it soon became apparent that the hospital, with all its facilities, was needed for major operations. In 1885 there were very few hospitals save in the larger cities, and they were built and maintained solely for the benefit of the indigent. This fact was the reason that for a long time there was an antipathy to entering a hospital, even though

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one paid his way. In the year mentioned there was only one hospital in Richmond, and if my memory serves me aright none other in the State. There were infirmaries in the public institutions and the Retreat for the Sick. But the only real hospital was St. Luke's, Dr. Hunter McGuire's private institution. The Old Dominion Hospital, on the College grounds, was little better than a dispensary. Of course there were no trained nurses, for the trained women of today were unknown. While a resident at the Retreat for the Sick we picked up attendants wherever we could find them, often having a new staff every two or three weeks,—women without any training whatever.

New methods and bacteriology together with the recognized importance of laboratory investigation are responsible for the increase in the number of hospitals and sanitaria also for the trained nurse who receives her training in these institutions. It is needless to expatiate on the blessings that ensue from this advance in medical science. Typhlitis and perityphlitis have become obsolete and in their place there is appendicitis. As late as 1890 Wyeth in his text book on surgery makes no mention of appendectomy. Previous to that time typhlitis was a medical disease, attributed to an inflammation of the connective tissue about the caecum. Doubtless the sloughing or perforated appendix, when found at autopsy, was looked on as the result rather than the cause. It may be interesting to note that the significance of the leucocyte and differential blood counts was first recognized in an endeavor to differentiate between a simple and a suppurating appendicitis.

Endocrinology is a science that has come into being within the past few years and, as yet, it is apparent that we are only on the threshold, for there is much more to be learned about the ductless glandular system.

In the field of physics two very notable discoveries have added a glamour to the past forty years—Roentgen's discovery of the so-called X-rays and Mme. Curie's isolation of radium. I suppose some of us older men can look back on the wonder, almost incredulity, we experienced when confronted by reproductions of the first X-ray photgraphs as published in the medical journals,—a few coins, a key and a knife, said to have been enclosed in a pasteboard box and exposed to a photographic plate in a light tight envelope; also to our amazement on seeing the bones outlined or a bullet embedded in the tissues, while using the fluoroscope. Now, through the improvement in apparatus and in technique and the learned ability to interpret what we see, there are few parts of the body hidden from our eyes. It is doubtful whether Mme. Curie foresaw, after her discovery of that mysterious and miraculous element, radium, that its chief field of usfulness to the human race would be in the domain of medicine.

Spinal puncture is comparatively a late procedure and intraspinal medication dates from Flexner's production of antimeningococcus serum about ten years ago.

Mechanics has added much to our facilities for diagnosis and treatment during the past forty years, not only in refinement in the manufacture of instruments but in the assistance given by instrument manufacturers in filling the designs for new instruments submitted by the medical inventors. The sphygmomanometer, a late invention, has opened to us a new field of investigation and demonstrated the causative factor in many previously obscure conditions and, in many instances, enabled us to ward off disaster. The cystoscope has made practicable the ureteral catheter. The bronchoscope, the Murphy button, and the intubation tube, are all inventions which have made their appearance within the past thirty or forty years.

Therapeutic advance has made many strides within the memory of most of us. Most of our synthetic drugs, practically all the coal tar preparations, active principles and glandular extracts are modern in their distribution to the profession. Of course salvarsan, its combinations and varieties, are of recent introduction. Standardization of drugs is comparatively a modern improvement.

In 1890, while at the Polyclinic in New York there was exhibited to the class the first tablets, as a curiosity. This method of prescribing has been generally accepted and the compact tablet case has supplanted the saddle bag for the country doctor, just as the buggy supplanted the saddle and was in its turn displaced by the automobile. The tablet is also responsible for the elimination of a good deal of guess work in prescribing.

Blood chemistry analysis of gastric and in-

testinal contents has been much elaborated of late.

Enough has been said to demonstrate what great advance has taken place in all branches of medical science during the past forty years and much more might be added. Despite all these added facilities toward the warfare against diseases we must be impressed by the thc fact that the older men who were denied these privileges were eminently successful in the combat. How little of the fundamentals were unknown and what a clear understanding of the science in all its ramifications they possessed and how much we owe to them can be best understood by reading the text books of forty or fifty years ago.

Modern medicine is but an improvement on the older science. It is a far cry from Watt's teakettle and Stephenson's rocket to the modern Mallet locomotive but the principle involved is the same. One is but an improvement on the other and so it is in medicine.

It has been said that specialism and the so-called group practice will sound the death knell of the general practitioner. It will not in your time nor in mine. In the large cities he may lose some of the characteristics of the family doctor but in the less densely populated towns and in the country he must, perforce, continue to be the all-round man, treating every ailment from the time of birth to the time of death; better equipped, perhaps, than the generation before him but none the less the mainstay of the community and the sympathetic friend on whom all may and do call in the time of trouble; willing and anxious to seek counsel and help from those who have devoted their talents to the study of some special branch and to take advantage of the facilities offered by the numerous hospitals and of the skill of the modern surgeon, which the past forty years have placed at his disposal.

TETANUS.*

By LANIER D. POLE, M. D., Hot Springs, Va.

My reason for bringing this subject before you is not that I have anything new to offer, but I feel that we men in private practise come upon tetanus so seldom, that we are very apt to forget that it may occur. Of course, if we were called at once to treat every wound, and were to treat every puncture wound as we were taught in our Principles of Surgery, and give each patient suffering with suspicious wounds anti-tetanus serum, we should almost never be called to treat a case of tetanus.

Unfortunately, the public attaches very little importance to superficial punctures of the hands and feet. Most persons make an effort to remove the nail, splinter, or what not, and apply a little tincture of iodine, dioxogen or turpentine to the surface, and believe that they have done all that is necessary, and in a week or so call a physician to treat a fully developed case of tetanus—as will be brought out in the case I am going to cite.

We should use every chance to impress upon the public that "lock jaw" is not caused by pain, as a great many believe, and try to teach our patients to recognize the dangerous kinds of wounds so they will have them treated at once, impressing on them that tetanus can be prevented very successfully by opening the wound to the bottom and by the giving of tetanus antitoxin. As a rule one dose of 1500 units given under the skin is all that is necessary, but in certain suspicious wounds we should give three doses at intervals of a week.

Recently I was called to see a boy of 8 years whose mother gave me the following history. Coming from the garden he ran a splinter from the porch into his foot. One of the family made an effort to remove it and, believing she had gotten it all out, put on turpentine and thought no more of it. The wound healed without giving any trouble. Seven days later he complained of pain in the neck and back muscles, but did not seem sick, so the mother thought nothing of it. On the eighth day the pain in the back was more troublesome but still he played and went in swimming as usual. That night he had difficulty in eating and during the night cried out several times with a pain between his shoulder blades, but went back to sleep in a few minutes.

The next morning I found him with a temperature of 99°, pulse 90, able to open his mouth with difficulty, muscles of neck and back very rigid, and head drawn back. During the examination he had a convulsion which lasted only a short time. The wound seemed perfectly healed, with no tenderness, swelling, or redness. I opened up the foot and about a dram of cloudy serum ran out. I removed a splinter 1¾ inches long, about the size of a

*Read bfore the Medical Association of the Valley of Virginia at its meeting in Clifton Forge, September 28, 1922.

match stem, cleaned and packed the wound with iodine, and gave him bromide by mouth and chloral hydrate by rectum. It was not until later in the day that I was able to get any antitoxin, and then only 3000 units. During the day he had two more convulsions and the rigidity of the muscles increased, until he was able to open his mouth only slightly.

That night I called Dr. Emmett in consultation and he gave him 5000 units in the spine and 5000 intravenously, one-eighth of a grain of morphine by hypodermic, and kept up the chloral by rectum and bromide by mouth. He improved for two days and then became restless and had a convulsion. I gave 5000 units intramuscularly and increased the chloral, but he did not improve in 24 hours, so I gave him 5000 units in the spine. Within 12 hours he was much better, being able to open his mouth about one-third inch and the muscles of the back were much less rigid.

He continued to improve rapidly from this time and was able to go to his home in two weeks and in another ten days seemed perfectly well.

DISCUSSION.

Dr. B. B. Dutton, Winchester: I want to say that, in the treatment of tetanus, the most important thing is prophylaxis, giving serum and giving it early. The incubation runs from four to twenty days. Serum should be repeated in ten days, as it gives immunity for only that length of time. The wound should be thoroughly cleansed, removing all foreign substance and traumatized tissue which has been devitalized, and a wet dressing of peroxide of hydrogen, magnesium peroxide or calcium peroxide applied. When you have a compound fracture or any old wound which you will not open up until a month or so afterward, you should give an immunity dose of serum at that time, as you may have tetanus develop. After the case has developed, the only treatment is to give sedatives, as chloral hydrate, chlorotone, luminal or morphia, and doses of antitetanic serum at once, twenty thousand units intraspinally, intravenously, intramuscularly, or subcutainously, or combined and repeated in twelve hours if necessary. If you are afraid of anaphylaxis in these cases, give 1 c.c. serum and wait half hour. If no symptoms develop, you are safe in going on with the treatment.

In severe cases with fast recurring convulsions, magnesium sulphate should be used intraspinally.

ROENTGENOLOGY IN ITS RELATION TO THE GENERAL PRACTITIONER.*

By W. M. PHELPS, M. D., Colonel M. R. C., U. S. Army, Staunton, Va.

Roentgenological procedure has become a most important factor in diagnosis as well as a great aid in the treatment of many pathological conditions.

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About twenty-five years ago, Professor Roentgen startled the scientific world with the announcement of his discovery of what he called the X-ray. Since that day physics and chemistry in the hands of inventive and constructive geniuses have contributed such a vast amount of material adapted to the practical utilization of the X-ray that it has probably become the most important single factor in scientific diagnosis. And the great improvements in the apparatus for roentgeno-therapy have resulted in most promising achievements in the treatment of many pathological conditions that heretofore have resisted therapeutic agencies.

A discussion of the expensive and complicated apparatus required for effective roentgen diagnosis and therapy does not come within the scope of my subject nor shall I consider at this time the technical procedures involved in their use. However, I want to emphasize the fact that the general practitioner of medicine or surgery should possess a theoretical knowledge of these procedures to enable him to co-operate with the roentgenologist in obtaining the best results for the patient.

Roentgenology is taking its place as one of the most highly specialized and technical branches of scientific diagnosis and, as in other specialties, the value of this work will be proportional to the time and study devoted to it by the one making it his specialty.

It has not been so many years ago that the family doctor per force of circumstances had to be his own specialist in all branches of diagnosis and therapy, not only functioning as an internist but also as a general surgeon as well as laboratory expert, oculist, aurist and what not, at the expense of his own peace of mind and the welfare of his patient.

The general practitioner was the first to realize the necessity of specialized assistance in his conscientious fight against the thousand natural shocks that flesh is heir to and, as the result of his insistence and co-operation, the "art" of healing is rapidly becoming a science through the agencies of specialized departments in the various branches of medicine and surgery.

The relation of the roentgenologist to the physician and surgeon differs materially from that of other specialists, as the results of his examinations are entirely for the information of the doctor who refers the case for exami-

nation and thus the doctor, not the patient, is his client.

The medical man must remember that a roentgenogram is not a photograph and that what the plate or fluoroscopic screen visibilizes is a series of shadows produced as a result of the differences in density and absorptive powers of the tissues through which the X-ray passes on its way to the plate or screen and that the value of the examination depends not only upon the excellence of the technique but also upon the ability of the expert to properly interpret the meaning of the shadows observed. The interpretation from which diagnosis is made is governed by what is actually seen on plate or screen; however, it must be borne in mind that a variety of different pathological conditions may present exactly the same roentgen appearance; therefore, to enable the roentgenologist to make a differential diagnosis, it is essential that the referring physician co-operate with the roentgenologist in an effort to determine the exact nature of the pathology present as otherwise the roentgenologist could determine from his examination only that one of several possible conditions is present.

Diagnostic technique and interpretative accuracy have advanced rapidly during the past five years so that at the present time roentgen procedure lends itself not only to a determination of anatomical relations of the various structures of the body but also in many cases visibilizes functional activity. Because of their density osseous structures of the body are most readily demonstrated in X-ray examination. Fractures and dislocations are readily demonstrated even when their absence or presence can not be positively determined by physical examination. In my practice I have observed a number of cases of fractures which clinically were justifiably diagnosed as simple sprains or contusions. On the other hand, I have had several cases referred to me in splints and casts which upon X-ray examination proved that an erroneous diagnosis of fracture had been made.

Many bone diseases present definite characteristic roentgenographic appearances, but it must be borne in mind that pathological conditions of the bones can not be visibilized until actual change in structure has been produced by the pathological process so that either the absorptive property, or density, of the tissues has become sufficiently changed by the pathological conditions present to affect the passage of the ray through them. As an illustration, let us consider osteomyelitis: An active, infectious process may be present in the medullary canal or may even have penetrated the Haversian system and still no change in density have occurred. Not until actual destruction of the tissue has taken place can changes in the structure be visibilized by the X-ray, so that in the very beginning of osteomyelitis it is impossible to demonstrate its presence. However, I have observed definite diagnostic changes in this disease in less than a week after clinical symptoms were manifested.

Changes in the bone or periosteum produced by syphilis, tuberculosis, malignancy and various benign tumors can usually be definitely recognized before the clinical symptoms in these structures have manifested themselves. The point I wish to emphasize in the instances I have cited is that the referring physician must not expect the roentgenologist to demonstrate the presence or absence of pathological conditions until definite change in normal structure has occurred with resultant change in density or X-ray absorptive properties of the tissues concerned, and diseases of the bones which are not accompanied by either productive or destructive pathological changes can not be demonstrated by means of the X-ray.

In disease affecting the head, it is possible to confirm or disprove a clinical diagnosis of sinusitis or mastoiditis after the parts concerned have become infiltrated with pus, thus changing the X-ray density of the cavities concerned, or when vegetative processes have developed in the lining membrane or sclerotic changes have occurred.

In examination of the teeth, apical changes can be shown and often are correctly diagnosed even in the absence of objective or subjective symptoms.

The chest cavity lends itself well to the exploration of the X-ray. The heart is readily visibilized and by modern methods its exact size and condition determined. All diseases of the lung and pleura whose pathology is accompanied by either productive or destructive processes are easily shown on the fluoroscopic screen or roentgenographic plate and in many cases the appearances presented are pathognomonic of definite diagnostic entities.

The alimentary canal may be visibilized in

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its entirely and many conditions of this tract definitely revealed that could only be guessed at or possibly entirely overlooked by any other means of examination. As you know, in making an examination of the digestive tract it is necessary to first administer a barium meal or enema and it is the shadow of this radiopaque material that is really seen on the screen or plate and it is the behavior of this material in its onward passage lining the interior of the tract that gives us our diagnostic data. The use of the barium meal for a gastro-intestinal roentgen study is based upon the fact that the stomach and intestines have the same or less radio density than the muscular wall of the abdomen and therefore would cast no shadow or rather their shadows would be obscured because of the inter-position of other tissues between the X-ray tube and the plate.

The subject of relative tissue density is an important one in making a roentgenological examination. The consideration of this subject will explain why the roentgenologist often fails to demonstrate the presence of gall-stones for in some cases gall-stones though present will have a density corresponding to the tissues surrounding them.

The kidneys, fortunately, have a greater density than the other abdominal tissues and therefore cast a definite shadow. However, it can be readily understood that in order to make a satisfactory roentgenogram of the kidneys the alimentary tract should be completely emptied by purgation and enema, otherwise the density of the contained material would cast an obscuring shadow over that of the kidney shadow.

The time limit of my paper prevents a discussion of the many pathological conditions of the abdominal contents that can be diagnosed by means of the roentgen ray and I can only remark in passing that the roentgenologist is now able to accurately diagnose many diseased conditions of the contents of the abdominal cavity that heretofore could only be discovered by means of exploratory surgical procedure.

I shall merely mention the use of the X-ray in localizing foreign bodies in various portions of the anatomy for, as is well known to this Society, the science of definite localization by means of the X-ray has become approximately exact.

I had hoped to include in my paper a discussion of the epochal progress of roentgeno-therapy, but the subject is so large and of such great importance that I feel that its discussion should be considered separately in another paper at some future date, but I venture to predict that within the next few years roentgenotherapy will have established itself as one of the most important therapeutic agencies at our disposal, especially in the treatment of malignancies and, furthermore, that even the use of radium will hold a secondary position to roentgenotherapy.

ACUTE INFECTIVE OSTEOMYELITIS WITH REPORT OF CASES.*

By M. J. PAYNE, M. D., F. A. C. S., Staunton, Va.

Acute infective osteomyelitis, acute pyogenic osteomyelitis, acute pyogenic periosteomyelitis, is an acute inflammation of the medullary substance of the bone due to pyogenic organisms. This is not a new disease, but some of our ideas of the disease and the treatment of the disease need to be made more clear. A better understanding of the early diagnosis of this disease is imperative.

The term, acute epiphysitis is sometimes incorrectly applied to the process, and, as will be presently understood, is not only incorrect terminology but does not correctly designate the part of the bone involved in the disease.

A more careful study of this subject demands a brief review of the anatomy and embryology of the parts.

In the development of bone the plates of the spongy bone are developed about the blood vessels. The bone lamellae and the lime salts are deposited about the blood vessels. The various layers of lime salts are concentrically arranged about the blood vessels, which lie centrally. The bone marrow which invests the blood vessels is covered by a highly vascular membrane called the medullary membrane. Extending from the medullary cavity through the compact bone to the periosteum are numerous openings, all of which contain blood vessels and structure identical with the medullary substance of the bone. This may be demonstrated by reflecting the normal periosteum from off the bone when numbers of bleeding points may be observed. The blood vessels are accompanied by lymph spaces, known as the perivascular lymph spaces or channels. (Though of great

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importance, time does not allow me to touch upon all the functions of the structures under consideration.)

The spaces of the spongy bone are filled by the derivatives of the mesenchyma, i. e., reticular tissue, blood vessels, fat cells and developing blood cells. Together these constitute the red bone marrow. Near the middle of the larger long bones we find the bone marrow less red, and here it is spoken of as yellow bone marrow. In the yellow bone marrow, fat predominates (96%), and gives rise to the peculiar and distinctive yellow color.

At the ends of large long bone the structure is notably different, for here cancellated bone is found and this characteristic persists during life. The periosteum is found to present two layers, first, the osteogenetic, next to the bone, and second, the outer layer which is intimately attached to and blends with the epiphyseal cartilages. The division of the periosteum into layers occurs at the juxta-epiphyseal line. You will, now, observe that a communication exists between the bone marrow and the periosteum at the ends of the long bones.

Bones grow mainly from the diaphyseal ends or near the epiphyseal cartilage, for here we find new tissue, growing tissue, which in the young is exceedingly vascular. This tissue is very easily traumatized. The attachment of the epiphysis to the shaft or body of the bone is not strong, and epiphyseal separation and injury is more frequent than it is thought to be. A slight twist is the most common injury. This should be clearly emphasized in all considerations of spinal injuries, deformities, or diseases of the vertebrae.

I wish you then to conceive of a bone, now, not in the old way, as a mass of lime salts with a few nutrient foramina for the passage of blood vessels intended to supply blood to the bone, but as a highly organized vascular tissue of blood vessels and perivascular lymph spaces, having a perforated outer hard casing with numerous vascular channels extending through the perforations to the periosteum. An avenue of communication also is found in the young between the bone marrow and the periosteum at the ends of growing long bone.

It seems, therefore, incredible that an acute infection could be limited to the medullary cavity or to the cancellous bone or to the periosteum, in view of the free communication that exists between the parts by means of the blood vessels, lymph channels, haversian canals and the juxta-epiphyseal line.

In the young the juxta-epiphyseal area contains growing cellular tissue of much activity, delicate, unstable and complicated, with an equilibrium which is easily disturbed, and a resistance which is often very slight. Hosts of blood vessels yet imperfect in their embryonic structure or development are present in this area. All these blood vessels communicate freely and are unable to expand. The periosteum is very vascular at this age, and is rich in cellular growth. You can now well see, therefore, how in tissue so arranged, an injury, exposure to cold, or an acute exanthema leads to the arrest of the pyogenic organisms which may be present or circulating in the patient's blood. The results of the arrest of the pyogenic bacteria in tisssue as above described are violent inflammation, hemorrhages, thrombosis, pus formation and necrosis of the bone structures, violent inflammation of the overlying soft tissues, attended by most profound evidence of absorption of septic products. Often, however, the inflammatory process is so widespread, (many avenues exist through which the pus may travel), or is so virulent that the clinical symptoms are interrupted by the death of the patient.

The causes may be classed as predisposing and bacterial. The predisposing causes are the acute infectious diseases, malnutrition, lowered general health, from any cause, bad hygienic surroundings, exposure to cold and injuries. A history of an injury is present in at least 50% of all cases. The injury is often trivial and is usually a twist induced by wrestling or falling, e. g., the hammer lock or half Nelson. You will now see the explanation for the frequence of the affection involving the condyles of the humerus, the lower end of the femur and the tibia, for these are the bones that are twisted, and, thereby, injuring the delicate structure at the bone-end.

I wish at this time to impress upon you the need for urging mothers to employ greater care with children in early life, in order to avoid trauma to the delicate bony parts, especially the spine, the humerus, femur, tibia, for I believe slight injuries of the vertebrae occasion an inflammation of the bony part often overlooked, at the time, but later resulting in spinal caries or spinal deformities. This is well worthy of our attention, in order to pre-

vent the minor spinal displacements that are receiving so much attention at this day.

Bacteriologic investigations show that the affection may be due to aerobic or anaerobic bacteria and that the process is not due to any specific organism. A mixed infection is often found, that is, of the specific organism of some disease and the pyogenic bacteria.

The staphylococcus aureus or albus and the streptococcus are the usual pus organisms found. The former is the one more often present. The presence of other organisms has been repeatedly demonstrated as the diplococcus, the bacillus coli, and the tetracoccus. The bacteria gain entrance through a lesion of the skin or mucous membrane, e. g., the respiratory, intestinal or genito-urinary tract. Diseases of the ear, otitis media (without pain) due to the pneumococcus, boils, pimples, skin diphtheria, trivial lesions of the skin and glandular involvements and infections of lungs, prostate, tonsils, etc., may be the focus of infection.

The disease usually commences in or near the end of the shaft of long bones and the following changes may be observed in the order named: Hyperaemia, oedema, softening and change in color of the bone marrow. Supuration rapidly ensues and the marrow is streaked, mottled with gray, and abscesses large or small form. The inflammatory area may be distinctly localized or in the malignant cases the entire medullary cavity may become rapidly involved. The disease is not limited to the medullary cavity but extends through the haversian canals and rapidly involves the tissues of the limb. The tendency to spread is more marked outwardly through the haversian canals and through the juxta-epiphyseal line than up or down in the medullary cavity.

The periosteum is separated from the bone by the rapid formation of the pus and in consequence the blood supply to the bone is cut off. The intense inflammation blocking the haversian canals further acts to cut off the blood supply to the bone. Rapid softening and destruction of the bone ensues. The destruction may be localized or widespread or affect multiple bones. The bone necrosis is at times so rapid and marked that pathological fracture of the bone occurs before the gravity of the case is recognized.

The joint is never involved primarily, but may be involved secondarily, especially in late cases or after operations in which the epiphysis is invaded by the operative procedure. The firm attachment of the periosteum to the epiphysis acts to safeguard the extension to the joint.

Acute osteomyelitis may be diagnosed in the first eight to twenty-four hours. The onset is sudden, abrupt and pronounced. Pain is the earliest symptom and is acute, boring aching of exceedingly severe nature. Following the pain we have evidences of absorption of septic products, that is chill, fever, weak rapid pulse, as is usually found in septic manifestations. Early, the local signs are marked tenderness near the junction of the shaft with the epiphysis. The joint and the epiphysis are not involved. Deep pressure elicits tenderness in the very earliest stages and increases the pain. Slight oedema is present. Loss of function is complete. Later the soft tissues overlying the affected part become tender, swollen, discolored, oedematous and finally necrotic. Effusion into the neighboring joints is quite frequent. The X-ray will disclose destruction or production. The actual destructive or productive process occurs late in the disease. Early negative X-ray findings therefore do not preclude the existence of an active infection. *The early symptoms then are essentially those of an acute infection or sepsis with the addition of local point tenderness.* The child is strikingly sick. Dilation of the superficial veins, separation of the epiphysis, spontaneous fracture, perforation of the joint and capillary stasis are all "end symptoms" and should be so classed and excluded from the symptomatology of the disease. The urine will often be found to contain albumen. The blood examination will show the red blood cells and hemoglobin, somewhat lower than normal with marked increase of white blood corpuscles and an increase in polymorphonuclear leucocytes. A blood culture will often show a rapid growth of some pyogenic organism.

Differential Diagnosis. The diseases with which acute osteomyelities are often confused are typhoid fever, acute articular rheumatism, meningitis, erysipelas, or phlegmonous inflammation of the soft parts and periostitis. The onset in typhoid is slow; in acute osteomyelitis the onset is abrupt. The white blood cells in typhoid are reduced in number, and the increase is marked in osteomyelitis, and is often high. The Widal re-

action occurs in typhoid late but blood culture may be positive early in typhoid. Osteomyelitis may be confused with meningitis when delirium and stupor exist. These should not confuse the careful diagnostician. Acute articular rheumatism probably is more often confused with osteomyelitis than any other disease. The pain in rheumatism is distinctly articular and usually affects more than one joint. The general symptoms are less severe in rheumatism. Violent inflammation of the soft parts and periostitis may prove confusing and at times misleading. The treatment, however, in these cases is essentially the same as in osteomyelitis.

Prognosis. This is an emergency of a greater gravity than an acute abdomen. The early diagnosis and early treatment of this disease are attended by good results. The results in cases properly treated within 24 hours of onset will show a mortality of not more than 10%, while cases operated upon later will show a mortality of from 30% to 100%. As an emergency these cases take precedence in the better hospitals.

Treatment.—Early incision of the soft parts and of the bone extended through to the medullary cavity with removal of foci, disinfection of the parts and drainage, without any attempt at immediate closure of the wound. No operation is complete without opening the medullary cavity. The various structures should be carefully observed and noted in the operative report. It is advisable to reduce the time of the operation to the minimum and to have "a light ether anaesthesia." Following the operation supportive treatment should be employed and the use of autogenous vaccines may be of value. The Carrel-Dakin treatment may be employed.

Early operations will save many lives. Early operations will save extensive removal of bone marrow. Early operations will save bone destruction and consequent deformity.

The faulty or impaired regeneration of the bone following osteomyelitis, either with or without operation, may result in crippling, future deformities and serious functional results.

Case Reports.

The first case occurred in a school girl, aged seven, with a negative family history, who was admitted to the hospital January 24, 1922, complaining of pain in the right leg. About November 2, 1921, the patient received one thousand units of antidiphtheritic serum, and developed diarrhea on November 17, 1921. There was no history of injury.

Beginning November 13, 1921, the child complained of a stiff ankle, and developed severe dull pain, especially at night, fever, chills, and sweats, gradually increasing in severity. Physical examination at that time showed a temperature of 104, the right leg markedly swollen and very tender, the great toe joint red and edematous. X-ray examination showed no bone pathology. Two or three days after this, we opened an abscess on the great toe, and about ten days later removed a loose phalanx, after which the wound promptly healed. Within three or four days we opened three abscesses on the leg, and a particle of bone was later discharged through a sinus.

X-ray examination, January 24, 1922, showed an osteomyelitis of the right fibula with destruction and proliferation, the entire shaft up to five c.m. of the upper end being involved. Operation the next day revealed extensive osteomyelitis of the right fibula corresponding in almost perfect detail with the X-ray plates. The patient made an uneventful recovery and was returned to her family physician February 20, 1922.

Laboratory Data.—Urinalysis before operation was negative save for a rare pus and blood cell. Blood count January 24, 1922, showed 13,800 leucocytes with 81 polymorphonuclear leucocytes, and a hemoglobin of 75%. Culture of pus yielded staphylococcus albus, pure culture. Guinea pig inoculation failed to show evidence of tuberculosis.

The second case occurred in a school child, aged nine, admitted to the hospital May 16, 1922. The family history was unimportant. The patient's past history was not unusual except for tonsillitis, until she had an attack of scarlatina, November, 1921, complicated by a cardiac lesion and followed by nervousness and anorexia.

Without previous injury the present illness came on suddenly May 10, 1922, with severe pain in the right hip, nausea and vomiting. Delirium developed May 12, 1922. The body became edematous May 14.

Physical examination on admission to the hospital showed an acutely ill child with jerky respirations and flushed cheeks, exhibiting involuntary movement of the hand. Physical

examination, except for bad tonsils, is unimportant except for extremities. The right limb is seen in a flexed abducted and externally rotated position, and is markedly swollen. There is great pain on movement, and the tissues over the upper thigh are resistant and hard. Attempts to flex the thigh result in marked rigidity. No crepitus is felt on rotation. The right ankle is slightly edematous over the joint, and the patellar reflex was not obtained.

X-ray report suggested osteomyelitis of the upper extremity of the right femur, but was not conclusive. Operation on the day of admission disclosed an area of dead bone, about one and one-half by five centimeters extending downward from the upper end of the great trochanter, and an abscess cavity lying posterior to and below the neck of the femur. The shaft was guttered and all apparent necrotic bone removed. Extensive exploration was not attempted, due to the critical condition of the patient. After the operation the patient exhibited profound shock and died at 9:30 P. M the following day.

Laboratory Data.—Urinalysis showed a trace of albumin and a few pus and blood cells with a rare hyaline cast. Blood count showed a leucocyte count of 9,000, with 85% polymorphonuclear leucocytes and very low hemoglobin. Culture of pus showed a pure growth of staphylococcus albus. Wassermann was negative.

The third patient was a school girl, aged eleven, and a sister of the second patient. She was admitted the day her sister died, May 17, 1922, complaining of pain in the right foot and left shoulder. Past history showed that six years ago the patient got a long thorn in the right heel and complained of her right hip. The leg would "draw" after walking any distance. A year ago the patient was bent to the right side. She is a mouth-breather.

The present illness began May 12, 1922, with severe pain in the right foot, and the child went to bed. The next day she had a high fever, but no other constitutional symptoms. The swelling on the outer side of the ankle was first noticed May 16th.

Physical examination was negative save for cryptic tonsils and the presence of swelling, edema, and induration in the right foot, ankle, and leg, with acute tenderness on pressure. The left lower extremity was negative. X-ray examination, May 17th, revealed an osteomyelitis of the right tibia extending from the epiphyseal line upward as far as the roentgenogram showed. The presence of pus was not visibilized.

Operation May 17th revealed the medullary canal filled with pus and broken down throughout the length of the tibia. The lower epiphysis appeared not to be affected. The operation was attended by profound shock, but the child reacted and became fully conscious. The next day a considerable amount of serous drainage appeared and the child was in an acutely toxic condition, passing away at noon.

Laboratory Data.—Urinalysis on admission showed a large quantity of albumen with 60 casts to a field. Blood count showed a leucocyte count of 28,700, with 91% polymorphonuclear leucocytes, and hemoglobin of 60%. Culture of pus showed a pure growth of staphylococcus aureus.

Discussion.

Dr. R. P. Bell, Staunton: I have not much to say on the paper. Dr. Payne covered practically everything. The importance of early diagnosis should be emphasized. It is very difficult to do sometimes. When you have a baby with a high temperature and unable to say what is wrong, it is exceedingly hard. I had a fatal case the same time Dr. Payne reported his two sisters. My case came in practically moribund, and died on the table. The baby had been sick two days. One other fatality occurred within a week. Both these cases had been treated by good men before coming into my hands. If you have any doubt, it is a good thing to make incision over the bone anyhow, and then if you get to a bone which is apparently healthy, bore a hole. Sometimes the trouble does not show through the periosteum.

Dr. Payne, in closing :In making an early diagnosis try to find the focus of infection, if possible. If you get a tender point, even though the X-ray says nothing, explore it.

SPECULATIONS CONCERNING THE GENESIS OF NEOPLASTIC DISEASES.*

By C. O. MILLER, M. D., New Market, Va.

Lack of time and access to the literature on the subject prevents the writer from making a review of the various speculations as to the cause and genesis of tumors. In the absence of such study he has made use of the latest and the most complete work on the subject which it has been his privilege to consult. No one could have written such a work as Ewing has produced in his second edition of Neoplastic Diseases without a great deal of personal research and a wide acquaintance with the literature along these lines.

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Every age, since the dawn of medicine, has presented its speculations as to the etiology of tumors, which speculations have assisted in advancing our knowledge by showing what was not the cause or by stimulating studies which have helped to clarify our conception of the processes involved.

Speculations as to the cause of cancer may be classified under the following heads:

1. Embryonal (Cohnheim's theory).
2. Cell Autonomy (involving tissue tension).
3. Heredity.
4. Trauma.
5. Parasitic.

As to Cohnheim's theory Ewing says, "While it explains the structure and occurrence of many tumors, wholly fails to reveal why the embryonal cells begin to grow and when growing produce malignant tumors instead of normal structures."

"The theory of cell autonomy introduces the conception of tissue tension, which conception is, perhaps, not proven, but there are many facts in its favor." Much has been said in favor of heredity and trauma as being important factors in tumor formation.

Near the end of Ewing's chapter on the historical review of cancer he says, "It became evident that the parasitic theory which had enjoyed general acceptance must be set aside as an inadequate explanation of the new facts of tumor origin and growth." In his chapter devoted to a review of the speculations as to the parasitic theory he says, "Yet it must be admitted that the growth of the cells is greatly influenced by the environment, and that peculiar external irritants of parasitic origin may greatly stimulate the nutrition and growth of cells. Biology cannot argue the cancer parasite out of existence, but it can demand objective data in its support;" and he sums up by saying, "In view of the considerations thus briefly reviewed it is impossible to regard as a valid hypothesis the conception of a specific group of parasites living in symbiosis with the cancer-cell and stimulating its growth and nutrition. All the facts are reasonably explained by regarding the cancer parasite as the cancer-cell."

After reviewing the subject one does not feel satisfied with its present status as offering a full and complete explanation of the genesis of neoplastic diseases.

Notwithstanding the weight of authority against the parasitic theory of the origin of tumors, the writer will present some speculations in its favor. There have been claims made of finding various parasitic forms as the cause of cancer, among which the mycetozoa have figured.

What are mycetozoa? At one time they were considered to belong to the vegetable kingdom, having affinities to fungi. Later de Bary classified them as belonging to the animal kingdom under the name of mycetozoa. Butschli, while recognizing them as having affinities more related to the animal than to the vegetable kingdom, does not include them among the protozoa.

Let us consider some points in the morphology of mycetozoa as determined from their cultivation. They have usually been cultivated in fluids without any effort to prevent contamination from the air and other sources. The writer's studies have been made from cultures grown in sterilized flasks and fluids, using aseptic methods to prevent contamination. If we start with the spore we find it can be dried, and if to these dried spores we add water the spore wall ruptures, and there creeps out of it a protoplasmic body, designated as a zoospore. It develops a flagellum, and can move through the water by means of the flagellum or, if it adhere to the slide, creeps around very much as an amœba does. These uninuclear bodies are in their amœboid phase a little larger than leucocytes. In the culture they multiply and after a few days some of them encyst. These cysts designated as microcysts have a thicker wall, and are a little larger than the spores. As development proceeds, the microcysts increase in number and with most of them found collected in clumps distributed over the bottom of the flask. In about two or three weeks there are found in and around these clumps small plasmodia, which grow by taking the microcysts into their interior and appropriating the cysts to their own growth. As development advances, the cysts diminish in number. The small plasmodia increase in number and size and fuse with each other to form a large plasmodium. When the proper conditions are present, the plasmodium crawls out of the water to form sporangia, whilst a few varieties very occasionally form sporangia in the water. In the sporangia are found a large

number of spores, thus returning to the point from which we started in this cycle of development. These sporangia are the most characteristic phase in this cycle of development, and from them mycetozoa are classified. The plasmodia of different mycetozoa frequently present distinguishing characteristics, but the differences are not sufficiently great to base a classification upon.

Plasmodia are soft protoplasmic masses which adhere to the surface over which they move, and their form to a certain extent is influenced by the character of the surface. If on a glass slide they spread out in a film or net work, or, as in the case of aethalium septicum growing in a pile of crushed oak (tan) bark, they accommodate themselves to the spaces in the bark, and its form might be visualized as having somewhat the appearance of a sponge, the channels or spaces of the sponge being packed with fragments of the bark instead of being filled with water, and the material of the sponge representing the soft plasmodium.

The protoplasm of plasmodia is soft and in appearance not unlike that of an amoeba. At times one can recognize an external layer, the ectoplasm, and a remaining central portion, the entoplasm. In their interior they have many nuclei distributed through the protoplasm; the nuclei differ in size and shape under varying conditions and in plasmodia of different varieties of mycetozoa. The plasmodia vary in size from several times the size of the zoospores to a mass at least large enough to cover the exterior of an earthenware flower crock holding about one and one-half liters. The term plasmodium is rather confusing in that it has been applied to the parasitic forms found in the blood of persons suffering from malarial infection, and although they are now classified under the head of sporozoa the term plasmodium malariae has not been entirely abandoned. In this communication the term plasmodium represents the multinuclear plasmodial mass, a prominent phase in the development of mycetozoa. In the cancer-cell has been described inclusions which have been interpreted to be stages in the life cycle of mycetozoa. This claim has been combated, and at present is discredited. The writer has not certainly seen these bodies, and he has no speculation to offer as to their presence or significance should they exist. The speculations he has to offer are based on the hypothesis that there are true plasmodia in a cancer. If there are, why has no one ever seen and described them? So far as the writer knows no one has described true plasmodia as being present in the cells or tissue of a plant or animal. They may take from the cells spores which will develop into plasmodia, and they interpret the mass of spores in the cells as having come from a plasmodium. However, the writer must admit that he has not had an opportunity of reading the original articles on clubroot of cabbage.

It is recognized that the cancerous mass is made up of elements which are derived from the human body, and a distinguishing characteristic is that these elements are atypical in their relation to each other, in their numbers or quantity, as well as in the appearance and functions of each individual element. Since it is recognized that the elements of cancer derived from the human body are atypical, then we are prepared to admit the probability of the plasmodia also being atypical; that is, they would not grow and spread out as they do on a glass slide. Not deriving their food from the same source and living under different conditions, their growth and steps in development might not be just the same as in a culture. So far as the writer's studies go he has not seen a microcyst or active zoospore in a fixed stained specimen or in fresh material.

The studies of cancer have all been made on a cancer developed and not on a cancer beginning so we have no positive knowledge as to the beginning of a cancer. In assuming that plasmodia may be found in a mammary cancer we may speculate as to its beginning growth. We do not know whether a single zoospore in the amoeboid stage or a small plasmodium having only several nuclei made its way along the milk ducts or whether it was carried along the blood current to the neighborhood of an acinus where it lodged. Try to visualize what would take place. The plasmodium has a local habitat and it does not hesitate to appropriate to itself nourishment from its surroundings. Is it going to be content to suck up some of the fluid in its neighborhood, or will it be more ambitious and have designs on more tempting and substantial morsels? In the cultures it appropriates to its own use the microcysts; why not try the experiment of isolating and engulfing a cell; or since under favorable surroundings in na-

ture it can even engulf a ciliatum, why not try the experiment of isolating an acinus and appropriating by one effort a number of cells? In its effort to isolate the cells the plasmodium must of necessity come in contact with the nerve plexus surrounding the acinus and supplying the cells with their enervation. The nerves resent this intrusion, they send off a hurry call for assistance. Does that assistance arrive by way of the blood vessel pouring out its serum? Serum is what the plasmodium lives in. Is the situation attractive enough for the leucocytes to enter the contest? If they do, is the plasmodium able to appropriate some of them to itself for its growth? But the blood alone is not able to stop the invasion. In fact, the plasmodium may be so pleased with what the blood vessels supply that it surrounds the terminal vessels in order that its supply of serum may be assured. Another call goes out for help, this time to the connective tissue. Here is a foe worthy of the contest, but it is slow in building up obstruction to limit the field of operation of the invader. In the meantime, the plasmodium has been growing in power and cunning. It discovers the lymph channels. Here the road is unobstructed for a time, and in these channels it finds side channels which also bring fluid so necessary to its subsistence.

Another factor presents itself. What of the epithelial cells taken up by the plasmodium? They have been separated from their surroundings. They are still at the same temperature. They are imbedded in a protoplasm which takes serum and material from the same source from which the cells have been receiving their supply. It may be true that there are slight alterations in the composition of the plasma, but these alterations may not be so great but that the cells can still live in the interior of the plasmodium. The plasmodium begins to take a paternalistic interest in its guests, for it finds out that the pressure from the increased and constricting connective tissue becomes unpleasant and that the pressure from within due to multiplying cells counterbalances the pressure from without. If at any time the food supply of the plasmodium becomes limited, a few of the guests can be appropriated to supply the deficiency.

The epithelial cells being released from the controlling and restraining influences of the nervous system, and in this respect having returned to their earlier embryonic condition, start on an orgy of proliferation, and give as a result monsters in the shape of cancer-cells. Perhaps after a time, when there has been little advance made, a concussion from without tears a rent in the obstructing connective tissue, and the plasmodium discovering lymph spaces, not compressed, rapidly advances along the lymph channels until it reaches a lymph gland, having carried some of its guests along. Thus we have a metastasis but not a beginning cancer. We might suppose that a fragment of the plasmodium with some of the epithelioid cells is separated from the plasmodium and carried along by the lymph current to the lymph glands, or they might pass beyond the lymph glands into the thoracic duct, and from there into the blood current, and by it be carried to a distant part of the body where it lodges and produces a metastatic growth.

Thus we would have a double parasitism: on the one hand, the plasmodium within the tissues of the animal body; and, on the other hand, the epithelioid (cancer) cells within the plasmodium. We might picture to ourselves the plasmodium withdrawing from a given area entirely, or leaving remains resembling in some respects the hypothalus or capilitium of plasmodia. If the cancer-cells were expelled from, or were abandoned by the plasmodium, would they have under the changed conditions vitality enough to continue to proliferate, or would they die and be represented by cells in various stages of degeneration?

The question may very properly be asked, Why has no one ever described such a parasite? Has any one looked for it? How large would it be? Any where from a small protoplasmic mass several times larger than a leucocyte containing several nuclei to a many nucleated protoplasmic mass coinciding in size with the area of cancerous invasion. We would visualize such a parasite in the earlier stages as containing a few apparently normal or very slightly changed epithelial cells included within the small plasmodium which would be represented by a thin film of more or less hyaline protoplasm on the periphery, within which might be seen a small quantity of fine granular or fibrillated protoplasm with several small round or oval nuclei, probably near the surface of the composite body.

It is not uncommon to see in one of the smaller protoplasmic branches of the cultivated plasmodium a microcyst filling up the

branch and only the very thin outer layer of hyaline protoplasm holding the microcyst in place. If we had a section transverse to the branch of such a plasmodium at the point of the included microcyst, and we could look down on the cut end of the branch we would see a microcyst enclosed in the transversely cut, thin, hyaline layer of protoplasm which if improperly interpreted we might consider to be the outer layer of the capsule of the microcyst. Again, we find in cultivated plasmodia larger branches that are crowded by a number of microcysts in different phases of digestion or degeneration, and we cannot make out any of the structure of the plasmodium except by following the contour of the branch from each end of the collection of microcysts.

If the plasmodium were coincident in size with that of the cancerous process, it would be impossible to see it with a microscope, or, in order that it might be studied macroscopically, to separate it from the structures it permeates. At best we could with a microscope only see a small part of a plasmodium as found in a tumor large enough to be certainly diagnosed as cancer. If we saw such a fraction of a plasmodium in a stained specimen cut thin, we would only see here and there a few small nuclei stained by nuclear stains just as the other cells derived from the human body are stained. Suppose we were fortunate enough to cut a lymph channel in half parallel to its long axis in which was an advancing plasmodium, and could look down upon the cut surface, we would see a string of epithelioid cells. On each side of it the connective tissue would be seen and between the string of cells and tissue a thin, almost hyaline layer or septum which can, by focusing, be followed around and under the string of cells forming a sheath for it. As we follow it around, we find on or near the bottom a few, small, scattered round nuclei stained with the same nuclear stain used to stain the tissues. It would not be at all difficult to overlook these nuclei or, if seen, to consider them as belonging to the tissues instead of interpreting them as nuclei belonging to a plasmodium which envelops the string of cells.

If we had such a parasitic form in cancer, how would we proceed to demonstrate a genetic relation to the disease? First, by demonstrating it in a living condition in the cancerous material; second, in demonstrating its presence in fixed specimens; third, by cultivating it outside of the human body, demonstrating a particular variety to be associated with a definite tumor; fourth by inoculating an animal and producing a like disease; fifth, cultivating from the diseased area of the inoculated animal the same variety of plasmodium. These conditions can only be met by having the time, opportunities, and material to employ in the investigation and to work from the proper view point.

What is the use of presenting these speculations? Having studied protozoa and mycetozoa under Professor Butschli, the writer published some of the results of his cultivation of mycetozoa,* and he feels that he has had practical experience sufficient to enable him to recognize an active plasmodium when he sees it, and his studies of preparations of fixed and stained plasmodia from cultures give him some insight as to what one would expect a plasmodium to look like if it were present in a cancer. He has recently studied a limited number of fresh specimens of malignant and benign tumors, as well as a number of stained sections of tumors, and is much encouraged to believe that a sufficient number of the five conditions mentioned above can be met to prove that neoplastic diseases have a definite parasitic origin.

If positive conclusions from his cultural studies can be drawn, we must conclude that benign as well as malignant neoplasia have a parasitic origin. The differences in tumors can be explained by the characteristics of special plasmodia, together with the different reactions of special tissues to the presence of the plasmodia as found in benign and malignant tumors.

There is much more that could be said on the subject, as the work is by no means completed, so that this communication must be considered as unfinished, and from its nature only a preliminary report, thus adding a few more to the numerous speculations on record as to the genesis of neoplastic diseases.

*The Quarterly Journal of Microscopical Science, No. 161, page 43—March, 1898.

REMARKS ON PERINEAL LACERATIONS.*

By W. DENNIS KENDIG, M. D., Kenbridge, Va.

The problem of perineal lacerations is as

*Read before the Southside Virginia Medical Association, at Victoria, September 12, 1922.

old as the human race. The literature on this subject is so extensive that an apology might appear necessary for its introduction, yet the advantages of an early repair of this condition, as a rule, in every case have not been fully recognized until recently. In this paper I simply desire to refresh our memory on this subject, call attention to the advantages of an early repair, and discuss the necessity of handling every torn perineum according to the surrounding circumstances of each case. The vast number of cases of lacerated perinei, which have not been repaired and the many cases of lacerated perinei which have been repaired without results, seen every day in the practice of medicine and surgery, bear evidence of the fact, that the last word has not been said on this subject. It has been discussed so much, and its bad effects are so well known, that not only the physicians; but even the laity have been educated as to the deleterious effects produced on the general health of women who are victims of the unrepaired perineum. Every physician doing obstetrical practice today should be prepared and equipped to take care of perineal lacerations.

According to different authors perineal tears occur, varying in frequency from 10 to 45 per cent, and with forceps deliveries showing as high as 85 per cent. Dr. Henry A. Bernstein, of New York, says that, from an investigation of the subject and from a service comprising a very large number of obstetrical cases, he is convinced that fully 75 per cent of the women that have undergone immediate suturing of the vaginal orifice, are later in need of a secondary operation, and that further, in view of the fact that much more than 50 per cent of all primiparae are lacerated at the time of confinement, it is safe to say that something is wrong with the general technique employed. In view of these facts a further study of the cause and repair of this deplorable condition should be beneficial.

The first and most important, and I think the key to this problem of repair, is the proper knowledge of the anatomy of the perineum. The perineum has a central point where converge the external sphincter ani muscle from behind, the superficial transverse perinei from each side, and the bulbo cavernosus from the front. The ischio cavernosus muscle lies along the edges of the pubis. These constitute what are called the superficial muscles, and are reinforced by the deep transverse perinei and the levator ani muscle. The levator ani is lined on its upper or visceral side by the recto vesical fascia, and is covered on its under surface by the ischiorectal or anal fascia. In repair of the perineum, it is as important to engage these fasciae as it is to engage the muscle for, if not backed up by the fascia, to give periods of rest, the muscle would tire out and become relaxed. The muscle of the greatest importance is the levator ani, for it not only supports the rectum, but the tendinous center of the perineum, the lower end of the vagina, and indirectly helps in the support of the uterus and bladder. The levator ani is said by DeLee to be always injured in labor, either torn, over-stretched, or to have small tears not noticeable until afterwards by relaxation of the pelvic floor. Practically all the muscles that form the perineum or are inserted into the central point of this organ arise directly or indirectly, in front from the pubis, on the side from the ischium, and behind from the sacrum, or coccyx, so it can readily be seen that when there is a tear of the perineum, contractions take place in every direction away from the point of laceration, producing a gaping of the parts. This gaping or contraction in every direction accounts for the fact that no lacerated perineum ever can be entirely restored to its original condition with the repair of the muscles. The earlier it is done, the more nearly the original condition is restored; however, it should be the duty of every physican when he finds an old unrepaired tear to use every argument to induce the patient to have an operation performed at once.

Primary operation is indicated in all cases of perineal lacerations except in eclampsia, post partum hemorrhage, great prostration or extreme weakness, infection of any kind, and devitalized tissue from long pressure. Early repair has many advantages, namely, time, money and worry is saved to the patient, the danger of infection is less, the torn tissues are more easily and better approximated, and no preliminary preparation is required. If you wait to repair the perineum later, the muscles retract and atrophy and then your results will not be as good. The bad lacerations such as those involving the rectum, bladder, or urethra should always be removed to the hospital at

once, as lacerations of this magnitude become major operations, and require the proper equipment and skill to perform them.

The causation and prophylactic treatment of tears, of course, are very important, but time will not allow their discussion in this paper.

At this point I wish very briefly to describe the technique of the operation. There are dozens of operations devised, but anatomically there is only one, and that is approximating the torn tissue, which will shorten the pelvic sling, and in this way obtain a strong buttress, against which pelvic pressure is exerted. The operation may be approached in different ways by different operators but it matters little so long as you have the basic principle in mind and obtain results. A review of the literature on this subject shows the fact that very few authors advise any exact operation, but they seem to think that a few sutures more or less deeply placed will serve the purpose. It is self evident that this practice cannot give uniformly good results, for the torn surfaces above or behind in the vagina may not be approximated, etc. If in the home, do not attempt repair with patient in bed; but try to get a table, if possible; usually a kitchen table is very satisfactory. Should this not be practicable, put the patient across the bed with the buttock well over the edge, and the feet in two chairs or the thighs held up by means of a sheet or straps, designed for this purpose, from the shoulder. Render as aseptic as possible the field of operation and surrounding parts. Pack the vagina with large gauze sponge, pushed well up into the posterior fornix to prevent the blood from uterus obscuring the field of operation. As in secondary operation, with the application of two tenacula, the different parts are brought into correct position before starting, so that we can get some idea of the rent and what is best to be done. This also can be done by placing the hand on either side of the external parts, and pushing the torn surface together. Now the muco-cutaneous edges of the wound are caught on each side, where it enters the vagina, with two Allis forceps, or can use a guide or traction suture. With the forceps or sutures, the wound can be held open for inspection. At this time the whole birth canal should be examined and, should other rents be found, repaired if necessary. With the labia widely separated, using a retractor held by an assistant from above if necessary, the wound is thoroughly cleansed, bleeding points caught up, and frayed or irregular edges smoothly trimmed, so as to bring the torn structures as near as possible into their normal anatomic relation. The muscles are brought together with twenty day, cat gut sutures. Always begin at the upper margin, and use three to six of these sutures according to requirements of the case. The needle is plunged into the muscle, entering just under the mucous membrane or skin, curving outwards towards the ischium and passing deeply at the side and bottom of wound, until the point of the needle approaches the rectum. Here the suture is passd very superficially over the rectum, and is continued in end of muscles on opposite side in the same manner. Where the parts over the rectum are very thin, have assistant insert the finger into the bowel. In this way the retracted tissue is lifted up, and perforation into the rectum avoided. The method should be used that seems to get the best apposition of the deep muscles, especially the levator ani. In case of tears of sulci they should be repaired the same way. For repair of tear in the edges of the vaginal mucous membrane, use a continuous 20 day chromic cat gut suture, beginning at the back or posterior side, place close together, and draw tightly to prevent seepage into the wound. The skin is then sutured in the same manner. If you think there is need of additional support externally, or there is a danger of the cat gut absorbing too soon, you can first put in several deep sutures of silk worm gut, which are tied after all the other sutures are put in. In case of complete tear, the rectum should be repaired first. In this case the rectal mucous membrane is approximated by a continuous small twenty day gut, beginning at the top. The needle is introduced and issues on the wounded surface of the rectum leaving out the mucous coat, and in this way does not pass into the gut. The torn ends of the sphincter muscle are then brought out of the wound or sphincter pit by use of the finger and forceps. The end of the muscle can as a usual thing be found easily by a small depression or pit. To get a good result introduce two sutures well to each side of the sphincter muscle and one in the middle. This is done in order to insure broad apposition. At least one of these sutures should unite the fascia. Some authorities use a deep stitch of silk worm gut to reinforce this, passing in from the skin surface. In case of infection,

better results would probably be gotten by using this suture. The perineal operation is now completed as above.

In complete laceration, a rectal tube should be inserted three or four inches up into the rectum, keeping it there about five days. The bowels, of course, should not be moved in this time, and the parts kept as clean as possible. The knees should be kept together and, to make sure, a bandage put around them if needed.

All obstetrical patients, if practicable, should be examined sixty days following delivery to see the results of a laceration, whether repaired or not, and, if no laceration was in evidence, to ascertain if there occurred a submucous tear or a general relaxation due to over-stretching of the parts. These mucous tears present practically the same sequelae as the lacerated perineum and occur many times without any tear of the skin or mucous membrane. They demand the same operative correction as the open tear, for the skin or mucous membrane alone will give very little support.

In this short paper I wish to drive home the point that all operable perineal lacerations should be repaired and repaired within a few hours after delivery. I fully realize that the repair of the torn perineum at home is in many cases fraught with difficulties; I realize that often there are few or no assistants of any kind; I realize that the aseptic conditions are not always what they should be; I realize that the lights in many rooms are not good enough for satisfactory work; and I realize that these and many other things are not conducive to the best results in perineal repair at home. Yet, with the resourcefulness which is acquired by every general practitioner, most of these handicaps can be successfully overcome. I think that a hospital offers the best conditions for success in these cases and every case of severe or moderately severe laceration should be carried there immediately for repair, if a hospital is convenient; but I further believe that every case of perineal laceration, not convenient to a hospital, should, unless contra-indicated by the condition of the patient, be immediately repaired at home. I have no new or special forms of technique to offer, I have no new methods of handling the patient, but I have an abiding conviction, born from experience and a study of this problem, that a careful deliberate, intelligent and thorough repair within a few hours after delivery will help reduce the number of women whose health is impaired by an injured perineum.

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COMPOUND FRACTURE OF THE ELBOW JOINT.

A Case Report.*

By CHAS. M. HAZEN, M. D., Richmond, Va.

HISTORY. A girl, aged seven, three weeks ago fell from hammock. After three days, the mother called Dr. Bennett, who found a fracture at the elbow and a wound from either a sharp article externally or a bone fragment.

RADIOGRAMS. I. Obliquely lateral—showed 1. Dislocation of olecranon inward and downward;

*Read before the Richmond Academy of Medicine and Surgery September 12, 1922.

2. Fracture of shaft of ulna and sharp fragment tilted forward;

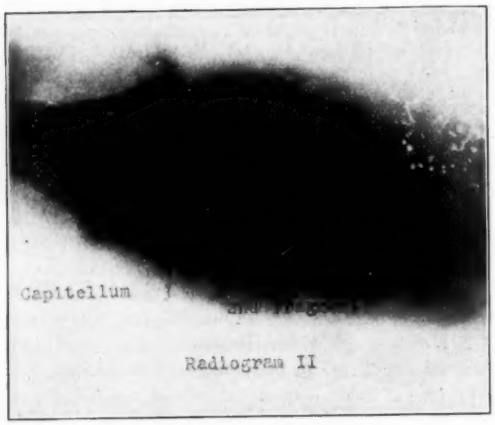
3. Separation of external condylar epiphysis of humerus;

4. Dislocation of head of radius inward and forward.

II. Antero-posterior, partial pronation—

1. Dislocation of olecranon;

2. Fracture of shaft of ulna about junction

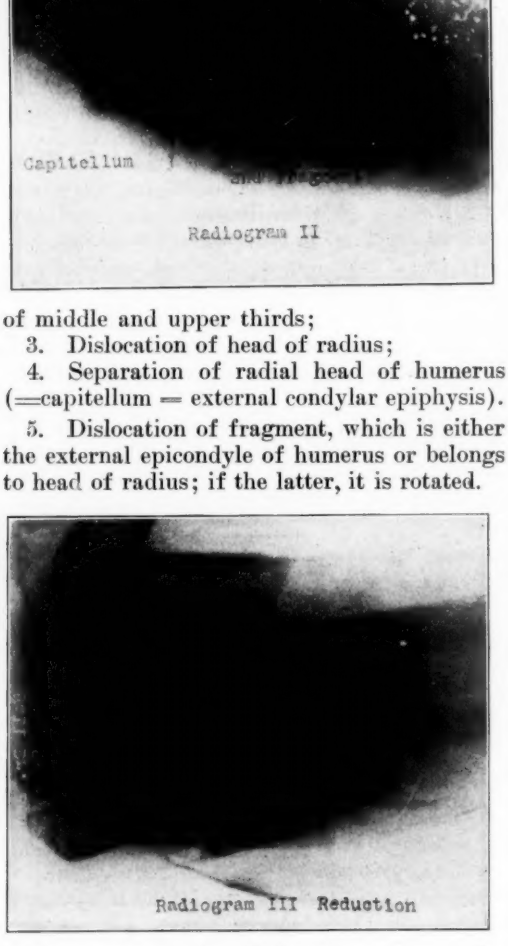


of middle and upper thirds;

3. Dislocation of head of radius;

4. Separation of radial head of humerus (=capitellum = external condylar epiphysis).

5. Dislocation of fragment, which is either the external epicondyle of humerus or belongs to head of radius; if the latter, it is rotated.



Mechanism. The dislocations from the humerus are due to either direct traumatism to the elbow, or to indirectly applied force by falling on the hand and fore-arm. The forward position of the ulnar fragment results from the pull of the brachialis anticus; there is probably some rotation from action of the pronator radii teres and supinators. These malpositions imply injury to the ligaments—the orbicular, anterior and external lateral, and to the synovia.

Treatment. Mechanism of reduction (under chloroform):

1. Forearm extended; reducing the ulna dislocation and fracture.

Splints applied anteriorly and posteriorly to forearm between pronation and supination.

2. Flexion of elbow, bringing triceps to bear on fragments to complete reduction of humerus and radius: fibres of the damaged ligaments are thus pulled and help to pull bone-elements into place. Position is maintained by circular adhesive strips.

Radiograms. III. Very obliquely lateral.

1. Dislocation of olecranon reduced;
2. Fracture of shaft of ulna reduced;
3. Dislocation of radius reduced.

IV. Anterior-posterior, flexion.

1. Dislocation of olecranon reduced;
2. Fracture of shaft of ulna reduced;
3. Dislocation of radius reduced;
4. Radial head of humerus in place;

5. Fragment in place—either external epicondyle, or from head of radius.

6. Internal epicondyle in place.

PROGNOSIS. There is a possibility of inflammation from compound injury; a chance of stiffness from involvement of synovia; a possibility of limited function from failure of the bones to unite in their present favorable position; a possibility that circulation and nerve-supply have been damaged, or that nerves may be caught in callus.

RESULT. After two and one-half weeks, there is partial function in every direction —flexion, extension, pronation, supination. The indications are for continued rest without splints, massage and passive motion carefully performed.

Fifth and Franklin Streets.

THE TOXICITY OF APINOL.*

By CHAS C. HASKELL, W. R. GARDNER, and S. P. HILEMAN, Richmond, Va.

The poisonous action of certain of the older germicides, such as mercuric chloride and phenol, has given rise to a considerable number of fatal cases of accidental poisoning. The danger is now so well recognized that these substances are never dispensed except in distinctive containers bearing the poison label. It is well known also by physicians that the local application of strong solutions of mercuric chloride or phenol may result in systemic poisoning. In view of this undesirable feature of the older agents, it is indeed desirable that an efficient, non-toxic germicide be discovered.

Several years ago, we became interested in the properties of a preparation marketed under the name of "Apinol." According to the report of the chemist employed by the manufacturers, Apinol consists largely of a terpene, laevomenthone. A request for detailed information from the manufacturers was answered to the effect that they were no longer sending out literature bearing on the product.

According to the labels on the bottles, Apinol may be used undiluted as an application to cuts, burns, bruises, lacerations, abrasions, and old sores, "except in cases of very tender skins, when it may be diluted with albolene or any neutral oil." Its internal administration also is recommended as follows: "From three to seven drops on a lump of sugar every two or three hours, will relieve or cure a bronchial cough." The label states that it has other uses; with these, we are not at present concerned. There is nothing on the containers which would suggest that the preparation possesses any toxicity for human beings; though it is said to be unsuited for use on cats.

Apinol is listed in New and Non-official Remedies, but no additional information appears in this publication. A search of the literature reveals only one clinical report of its use; this appearing in a paper by Harris. (*Internat. Jour. of Surgery*, Dec. 1911.) The preparation is used extensively in this locality, especially in the treatment of burns; cases having been called to our attention where it was applied, diluted with an equal amount of petrolatum, to large surfaces of the body. It is a well known fact that oil of turpentine, formerly so widely used by the laity, is by no means devoid of toxicity; and, since Apinol and oil of turpentine may be said to possess a certain similarity, it seemed desirable to ascertain if the former were likewise poisonous.

Experiments were carried out first by injecting Apinol intravenously into dogs. For these tests, small dogs were selected and the injections made into the ear vein, with one exception. For purposes of comparison, similar experiments were made with the official liquefied phenol.

Moderate doses of Apinol, 0.1 c.c. per kilogram body weight, injected into the ear vein of a dog, soon cause marked evidence of depression of the central nervous system; incoordination, resembling that following alcohol, making its appearance. The animal apparently suffers no pain and shows no fear, but walks with a staggering gait, frequently falling over. The pronounced effects usually persist one or two hours, but there is some evidence of depression at the end of twenty-four hours. If the dose be increased to 0.15 c.c. per kilogram, there is immediate appearance of severe pain manifested by the dog; it cries out loudly and then falls over in a convulsion. When death occurs, it is due to respiratory failure, the heart continuing to beat for several minutes. The following protocol illustrates the train of events following the intravenous injection of a dose of 0.2 c.c. Apinol per kilogram.

January 26, 1921.—Female fox terrier; wt. 3.8 Kgm.

*From the Laboratory of Pharmacology, Medical College of Va., Richmond.

4:27 P. M.—0.2 c.c. Apinol per Kgm. injected into ear vein. In five seconds following the injection, the animal cries out and starts to run blindly; falls over in convulsion.

4:30—Respiration ceases.

4:32—Heart beat no longer palpable.

In order to determine the minimal lethal dose intravenously for dogs, seven animals were used; the injection being made into the ear vein in six, as has been previously intimated. The results of these experiments are given in Table 1.

TABLE 1.

Apinol Intravenously into Dogs.

WT. IN KGM.	DOSE IN CC. PER KGM.	RESULT.
5.8	0.10	Recovered.
3.93	0.15	Recovered.
3.52	0.15	Death in 2 minutes.
5.8	0.20	Death in 3 minutes.
4.09	0.20	Death after several hours.
3.8	0.20	Death in 5 minutes.
4.2	0.20	Death in 3 minutes.

The results of the injection of the liquefied phenol, which, as has been mentioned, were made for purposes of camparison, appear in Table 2. Eight animals were used and the injections made into the ear vein in all cases.

TABLE 2.

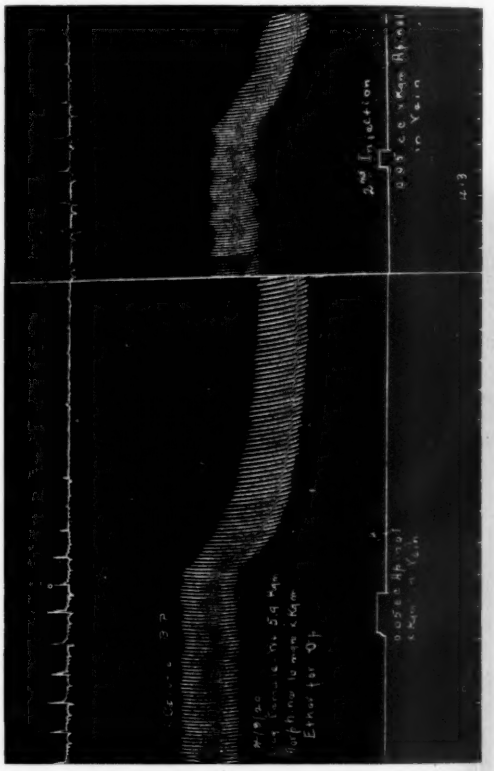
Phenol Intravenously into Dogs.

WT. IN KGM.	DOSE IN CC. PER KGM.	RESULT.
4.4	0.050	Recovered.
5.11	0.100	Recovered.
6.9	0.125	Recovered.
4.68	0.125	Recovered.
9.85	0.125	Recovered.
6.81	0.125	Death in 6 minutes.
5.39	0.150	Death in 3 minutes.
7.15	0.150	Death in 20 minutes.

From the figures given in these two tables, it may be assumed that the minimal lethal dose of Apinol is about 0.175 c.c. per kilogram; while that of the official liquefied phenol is slightly lower, being about 0.135 c.c. per kilogram. It is evident, therefore, that after Apinol has entered the circulation its toxicity is not far from that of liquefied phenol.

From the experiments on these intact animals, the impression was gotten that death was due to a depression of the respiratory center. This was verified by obtaining simultaneous records of the blood-pressure and respiration of anesthetized dogs. In addition to the temporary stoppage of respiration produced by the intravenous injection of a dose of Apinol amounting to 0.05 c.c. per kilogram, there resulted also a decided fall in the blood-pressure, accompanied by a slowing of the heart beat. These points are illustrated by Tracing 1.

The fall in blood-pressure may be due either to a vascular or a cardiac action of the drug; in order to determine this, simultaneous blood-pressure and cardiac tracings were taken; the former by a membrane manometer; the latter by a Cushny myocardiograph. It is evident from Tracing 2 that both a vascular and a cardiac depression take place after the intravenous injection of 0.05 c.c. of Apinol per kilogram into the vein of a dog; the fall in the blood-pressure occurring before there is a pronounced effect on the heart.



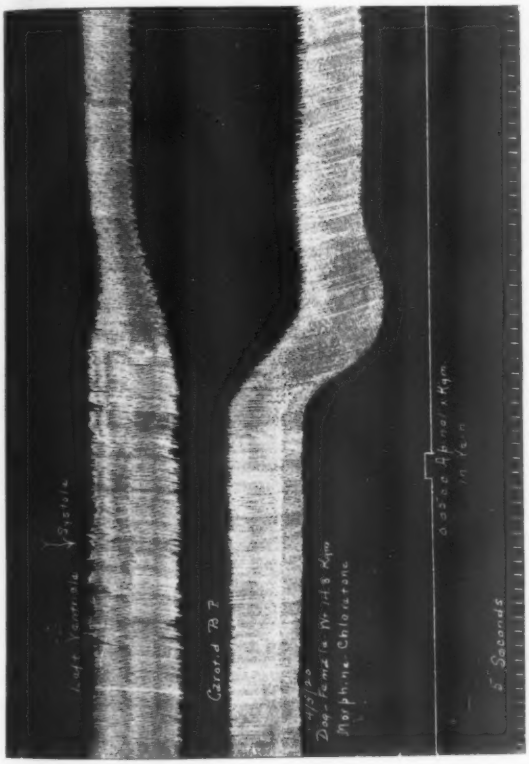
Obviously, the results following the intravenous injection of a drug do not furnish us with a true criterion by which to judge its "clinical" toxicity; because there are many substances which may be safely administered orally or applied locally, but which would produce serious or fatal effects if injected into the vessels. Therefore, experiments were carried out to determine the toxicity of Apinol for

dogs by oral administration. The results of these experiments are given in Table 3.

TABLE 3.
Apinol Orally to Dogs.

WT. IN KGM.	DOSE IN CC. PER KGM.	RESULT.
8.2	0.50	Recovered.
5.0	0.50	Recovered.
7.7	1.00	Recovered.
9.5	1.00	Recovered.
6.6	1.25	Recovered.
7.9	1.25	Recovered.
2.9	1.50	Recovered.
7.0	1.50	Died.
6.6	1.50	Died.
5.7	1.75	Died.

These animals were all given a preliminary subcutaneous injection of 10 mgm. morphine sulphate per kilogram body weight in order



to prevent emesis, which invariably occurred after the oral administration of the Apinol alone.

In our experience, the dose of 1 c.c. liquefied phenol per kilogram orally is invariably fatal to dogs; it is evident, therefore, that Apinol is somewhat less toxic for these animals by oral administration than is the case with phenol; the fatal dose of the former being at least fifty to seventy-five per cent larger than the latter. Nevertheless, the results indicate that the fatal dose for a person of average size would be less than five ounces; in cases of diseased individuals or small children, the dose would, in all probability, be much less.

To simulate the conditions where Apinol is applied to a denuded surface, as lacerated wounds or burns, the drug was injected subcutaneously into cats. As shown by Table 4, the toxicity of Apinol administered in this way to cats is less than it is orally for dogs. This may be due to a difference in the resistance of the animals or else to slower and more imperfect absorption from the subcutaneous tissues. This latter possibility seems to be rendered the more likely from the fact that in all cases where the site of the injection was cut down upon after the animal's death, there was found a considerable amount of the injected dose unabsorbed.

TABLE 4.
Apinol Subcutaneously to Cats.

WT. IN KGM.	DOSE IN CC. PER KGM.	RESULT.
2.77	0.25	Recovered.
3.95	0.50	Recovered.
2.95	0.75	Recovered.
4.1	1.50	Recovered.
3.75	1.75	Died.
2.7	2.00	Recovered.
2.6	2.00	Recovered.
2.66	2.00	Recovered.
1.73	2.50	Died.
3.09	2.50	Died.
2.7	2.50	Died.
1.97	2.50	Died.

Autopsy of the animals that succumbed to the poisoning by Apinol revealed as the most conspicuous gross lesion a hemorrhagic condition of the lungs. This was so pronounced in some cases as to lead to almost complete consolidation, even though death had occurred within a few minutes after intravenous injection. Where several hours elapsed before death, the pleural cavities contained several hundred cubic centimeters of fluid blood. In the animals that had received Apinol orally, there was intense congestion of the gastro-intestinal tract, extending throughout its entire length. In some cases, there was considerable bloody mucus in the intestinal lumen. The liver and kidneys showed marked congestion. Dr. S. W. Budd was kind enough to examine sections of the lung, stomach, liver, and kidney microscopically, and made the following report:

"*Lung*: intense congestion, with small

patches of leucocytes scattered in the congested zones.

"*Stomach*: slight coat of bloody mucus. Decided cloudy swelling of mucosal gland cells; and, at opening of glands, there is marked evidence of disintegration of the cells. Muscularis and submucosa not altered.

"*Liver*: intense cloudy swelling; focal necrosis located around branches of the portal vein. Mild congestion everywhere.

"*Kidney*: marked cloudy swelling. Glomerulo-tubular nephritis; very pronounced. Glomeruli very distended. Tubules show a most pronounced cloudy swelling."

We wish to make it clear that we offer no criticism against the clinical use of Apinol. So far as we know, the preparation may have distinct therapeutic indications; but we do believe that physicians should realize that in Apinol they have a substance which approaches liquefied phenol in toxicity; and care should be used in its application to large denuded areas or in its oral administration.

REPORT OF A CASE OF HYDATIDIFORM MOLE.

By J. L. RAWLS, M. D., Norfolk, Va.

In a hydatic mole there is a rapid proliferation of chorionic villi with the formation of small cysts. It is well to remember that a hydatidiform, hydatic or vesicular mole may entirely destroy a pregnancy or may grow in conjunction with it or with a twin pregnancy. In other words, if occurring early in pregnancy, the fetus may be destroyed and the mole develop alone, or, if occurring late in pregnancy, involving only a part of the chorion, a living baby may be delivered or a live twin accompanied by a decidual mole.

McCallum states that during pregnancy there is a curious invasive growth of the chorionic villi into the uterine wall and it is not unusual to find giant cells lodged between the muscles deep down within the walls of the uterus. They have been known to invade blood vessels and to be carried as emboli to distant organs. After the pregnancy, these invasive cells promptly disappear as though the body had some mechanism for destroying them.

Two curious abnormal conditions may arise as the result of a conception; first, the development of a hydatic mole and there is expelled not a child but a mass of polypoid gelatinous structures which hang together like a bunch of grapes. Microscopically, these polypoid blebs are found to be small chorionic villi enormously enlarged and covered with proliferated epithelium. A section of the uterus removed at this time will show an invasion of these cells in the uterine wall.

The other abnormality following conception is the development and metastasis of chorion epithelioma, which may follow a normal pregnancy, an abortion, an ectopic pregnancy or a placental mole. It is a significant fact, however, that fifty per cent of chorio-epithelioma follow hydatic moles and it is claimed sixteen per cent of hydatic moles become malignant.

Another curious thing in connection with chorioma, pointed out by Marchan in 1895 and mentioned by a number of observers since, is the notable frequency of ovarian cysts, ninety-one per cent presenting bilateral cystic changes. They are apparently corpus luteum cysts that sometimes disappear after the removal of the mole; at other times they do not develop until after the original trouble has been cleared up.

There are three important symptoms of hydatic mole: rapid increase in the size of the uterus, the discharge of blood or bloody serum per vagina, and the escape of vesicles. The last is pathognomonic but is a rather rare occurrence.

With this brief summary I wish to present the following case which came under the care of Drs. Chapman and Burfoot: Mrs. B. L. B., aged 17 years, married in November, 1919. Father died of leukemia, family history otherwise negative. She had diphtheria at nine years and typhoid fever at ten. She had her tonsils and adenoids removed six months ago. Influenza in February, 1920, no other illness. Menses began at fifteen years, regular, with a moderate amount of pain. Her last regular menstruation in July, 1920. She did not menstruate again for forty-seven days. She then had a normal flow for four or five days. She had no further menstruation until October 1st, 1920, when she had severe cramps in her abdomen with vomiting, and began flowing. She was seen by Drs. Chapman and Burfoot who sent her in the hospital with a probable diagnosis of ectopic pregnancy.

After forty-eight hours' stay in the hos-

pital she was sent home. No definite diagnosis was made but it was stated that she did not have an ectopic pregnancy. She continued with a slight bloody flow and persistent vomiting. Ten days later she was sent to another hospital. Their records show an intra-uterine growth which came to the level of the umbilicus. Pulse and temperature normal. Vomited once or twice in twenty-four hours and had a slight bloody vaginal discharge each day. Her condition apparently did not justify interference so at the end of the week she was sent home. After reaching home her condition became much worse. Her vomiting was almost constant in spite of two ampules of corpus luteum a day. Her vaginal discharge required two pads a day. She was referred to me by Dr. Chapman on December 1st, 1920. At that time she was vomiting at irregular intervals but was retaining very little fluid in the twenty-four hours. Her temperature was recorded from 96-4 to 98-6. Pulse rate 120 to 130. Her urine showed a marked diminution in phthalein output, a heavy cloud of albumen, no casts but a few white blood cells. Her blood showed Hgb. 60%; R. B. C. 3,000,000; W. B. C. 5,600; differential count about normal. Blood pressure 160-80. Her physical examination was negative except for an intra-uterine growth about the size of a seven months' pregnancy. There were no fetal heart sounds nor could any solid mass be palpated. The cervix had softened and admitted the tip of the index finger. She had a dark bloody vaginal discharge.

On December 3rd, it was decided to do a hysterotomy. Dr. Lankford was called in consultation and suggested the probability of a vesicular mole, basing his supposition on the rapid growth of the uterus, out of all proportion to the length of the pregnancy and the absence of all evidence of a fetus. In spite of this diagnosis it was decided that a hysterotomy would give her the best show. The uterus was incised and thoroughly wiped out with gauze. There seemed to be very little invasion of the uterine wall with the chorionic cyst. Tubes and ovaries were normal. The uterus was closed as in an ordinary Caesarean section and the abdomen closed without drainage. She had a rather stormy time for the first three or four days then went to an uneventful recovery. There was very little operative or post-operative bleeding. The wound healed by first intention and she was discharged from the hospital on December 15th, 1920. On December 22nd, 1920, she was readmitted to the hospital with a temperature of 101-6, complaining of cramping pains in her lower abdomen, tenderness and a bloody vaginal discharge. Her temperature was normal in twenty-four hours and she had no subsequent rise. Her cramps and vaginal discharge also promptly cleared up. She was discharged on January 8th, 1921. At that time a vaginal examination showed the fundus of the uterus to be at the top of the symphysis, movable and not very tender. There was a boggy mass in the cul-de-sac which felt like fallopian tubes.

She was told to report every two weeks for examination and earlier if she noticed anything unusual.

She was admitted to St. Vincent's Hospital February 23rd, 1921, with a history that she had some bloody vaginal discharge every day since leaving the hospital. At that time the uterus was subinvoluted, soft and boggy. At operation it was about 18 cm. deep. Several fresh vesicles were removed with the curette. The scrapings from the uterine wall were reported non-malignant. 50 Mgm. of radium were introduced into the uterine cavity for eight hours (400 Mgm. hours).

She reported for examination April 4th, 1921. The uterus was firm, normal in size and she stated that, with the exception of a normal three-day menstruation in March, she had no further bleeding after leaving the hospital. She was last seen in June, 1922. At that time she stated that her menstruation had been normal, of three days' duration, without pain since her last operation in February, 1921.

She had put on considerable weight and there was marked improvement in her general condition.

I have reported this case because of the apparent benefit derived from the radium application. Of course, the curettement alone might have been just as effective.

142 *Main Street.*

The Journal of Intravenous Therapy,

100 West 21 Street, New York City, will be glad to send a copy of this journal, upon request, to any one interested in intravenous medication.

PROPHYLAXIS IN ACUTE TYMPANIC DISEASES.*

By J. WARREN WHITE, A. B., M. D., Norfolk, Virginia.

In every branch of medicine today we are bending our efforts towards prevention. We can not intelligently proceed in this direction until we have worked out the etiological factors in a given disease. An effort should be made not only to relieve acute conditions but to prevent recurrences.

The physician, who relieves the symptoms in an acute middle ear infection and treats the ear until the condition clears up, may think that he has done his whole duty towards the patient. I feel, however, that he has not met the obligation until he has studied the underlying causes in each case of middle ear inflammation with the idea of preventing a recurrence of the infection. When we consider what may be accomplished in preventing middle ear diseases, we can easily see that this is an important branch of preventive medicine.

The etiological factors in acute middle ear inflammations may give rise to a very mild degree of tympanic congestion or a severe form of purulent otitis media, and it is impossible to make any dogmatic statement as to which will give a mild or a severe degree of middle ear inflammation. I think that the resistance of the patient at the time of the infection is the controlling factor as to the mildness or severity of the inflammation.

In the mild cases the membrana tensa shows a marked injection and there is an absence of bulging. This condition usually clears up without operative interference. In the severe cases the membrana tensa is red and bulging and a free myringotomy is indicated. These cases clear up unless complicated by mastoiditis or a chronic process. In the cases that clear up recurrences are frequent, especially among children. It is unnecessary for me to dwell on the dangers from recurrent acute or chronic suppurative middle ear lesions. Our efforts in prevention can only be successful by studying the underlying causes in each case of tympanic infection.

The individual of lowered vitality is more susceptible to middle ear infection than the physically robust. The prevalence of suppurative middle ear lesions among the ill-nourished shows conclusively the susceptibility of this class of patients. That this is a predisposing cause is not generally recognized for the reason that so many cases are overlooked. After drainage is established by a large perforation in the drum head, there is no pain and usually no constitutional symptoms to attract attention to the ear. In a dispensary practice among children, if a routine aural examination is made, a great many suppurative middle ear lesions will be found that otherwise would be passed over in the hurry of a big clinic.

Children undoubtedly are more susceptible to acute middle ear infections than adults. The eustachian tubes in infants and children are anatomically different from those of adults. Its length in an infant at birth is 15 to 16 mm. and in an adult 34 to 38 mm. The calibre of the bony tube of an infant is about as large as in an adult. The membranous and osseous portions of the tube in an infant do not form an angle as they do in an adult, but are nearly in a straight line. Thus in an infant we have almost a straight line only 15 to 16 mm. long and with calibre quite as large as in the adult. In an infant, therefore, the whole canal is much wider in proportion to its length. These anatomical differences are rapidly modified with the growth of the child. In this way can be explained how easily pharyngeal infection is followed by middle ear diseases in children. Adenoids are very frequent in childhood rendering them peculiarly susceptible to pharyngeal infection. Nasal obstruction is one of the most potent predisposing causes of tympanic infection. Large masses of adenoid tissue in the nasopharynx interfering with nasal respiration are a constant menace to the ears, even though the faucial tonsils may be apparently normal. A physician who gives any thought to the subject will see the important relation of adenoids to tympanic diseases. A majority of middle ear diseases in children occur in those having adenoids. Children are very susceptible to the acute infectious diseases and middle ear infections are one of the most usual complications. A careful observation will show that children who have had a successful removal of the adenoids and tonsils will have fewer aural complications in the acute infectious diseases.

Deviations of the nasal septum are among the lesions causing nasal obstruction. This more frequently gives aural complications in adult life.

*Read at the meeting of the Seabord Medical Society at Norfolk, Va., December, 1921.

Acute middle ear infections often follow an acute coryza. In questioning the patient as to how the condition came on, they will frequently answer it followed "a severe cold."

Scarlet fever, diphtheria, measles, pertussis and influenza are the diseases most frequently complicated by tympanic infection.

Among the external causes I will mention a few of the most common. The nasal douche is frequently advised by the physician. It may seem necessary at times; however, it is a very unsafe procedure and not an infrequent cause of middle ear infection. I will report two cases that came under my observation. A nurse while using the nasal douche said that she choked slightly and felt the water go in her ear. She came immediately to the hospital complaining of severe pain in the ear. On examination I found the drum red and bulging. A man, with an empyema of both antra, had daily irrigation of both antra and the nasal cavity by his physician. In a few days a middle ear infection followed in each ear and later on a double mastoidectomy was done. I mention these two cases to show the dangers of the nasal douche, even when used by those who are skillful, and the danger of prescribing it as a routine. I feel that the nasal douche should not be prescribed unless absolutely necessary.

During the swimming season we have quite a number of acute middle ear infections due to diving in cold water. This can be explained by the water taken into the mouth or nose being propelled through the eustachian tubes to the middle ear. Care should be taken not to expel violently water taken into the mouth or nose.

I wish to emphasize the danger in any effort to violently expel nasal discharges with both nostrils closed. This is most important while any acute infections of the nasal cavities are present. I have repeatedly had cases with an acute coryza to tell me that the pain in the ear came on immediately after violently blowing the nose. This point should be brought out to our patients and especially if they are suffering with an acute coryza.

Mastoid infection is practically never a primary condition. It is due to an extension of the infection from nose, naso-pharynx, adenoids and tonsils through the eustachian tube and middle ear. Care should be given the nose, naso-pharynx and throat and any acute infection should receive prompt attention. Prompt drainage should be instituted if there is any infection of the middle ear.

Infections of the middle ear occur most frequently during the winter and spring months. If during this time every effort has been made in a prophylactic measure, the number of cases will be materially reduced.

SUMMARY.

1. Recurrent acute and chronic middle ear lesions are always dangerous.

2. The etiological factors in each case should be studied with an idea of preventing recurrences in the acute conditions and of eliminating the chronic suppurative processes.

3. Nasal obstruction is one of the most potent predisposing causes, and those with no nasal obstruction have fewer aural complications.

4. The eustachian tubes in infants and children are anatomically different from those of adults. They are shorter, nearly in a straight line and with a calibre almost as large as an adult. Any pharyngeal infection is more easily followed by middle ear disease.

In a short paper it is impossible except in a general way to bring out some of the underlying causes in acute tympanic diseases in an effort to stimulate study of this condition, in order to reduce middle ear lesions.

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CO-OPERATION BETWEEN INTERNIST AND DENTIST.*

By WARREN T. VAUGHAN, M. D., Richmond, Va.

In the history of clinical medicine and surgery, the first quarter of the twentieth century will stand as an era of non-cooperative specialism. With the rapid development of medical science during the last part of the nineteenth century, physicians soon recognized that for best work, high degrees of specialization had become necessary. This individualistic specialism has served its purpose particularly by enabling each to develop and perfect methods of examination and treatment in his individual sphere. This has been accomplished, however, with considerable sacrifice of horizon, and of successful correlation among the various fields. The progressive men of today are laboring to eliminate these defects by fostering cooperative interest among the various branches of medicine.

*Read before the Richmond Dental Society, June 1, 1922.

In the work of every man conscientiously practicing the art of medicine or surgery, and this broadly includes dentistry, the first and foremost consideration should be, and is, the welfare of the patient. The value to the patient of a specialist in any given field may be expressed by a fraction, the denominator of which symbolizes the patient's medical problem as a whole; the numerator the importance of the specialist's work relative to the entire problem. For any one branch of medicine the numerator is never as great as the denominator. True, the numerators of some of the broader fields of specialization may have greater relative values than others, but it is not until all are combined that they finally acquire a value equivalent to that of the denominator, thereby forming an integer, denoting complete and efficient service to the best interests of the patient. Internal medicine, surgery, otolaryngology, ophthalmology, orthopedics, and all of the specialties, in so far as they bear on the individual case, must be correlated and integrated before maximum efficiency can be assured. And, as long as dentistry and oral surgery are omitted from the list, the sum of all the fractions will still remain less than one.

Just as rhinology and ophthalmology have within recent years been drawn into closer association with internal medicine, so also have internal medicine and dentistry been effecting a rapprochement which as time proceeds will be drawn closer and more firmly, in spite of vehement denials of isolationists. True, medicine has been less closely associated with dentistry than with many of the specialties, but the impetus given by the study of focal infection has served more rapidly to bring the two together. The progressive internist and dentist who read aright the future development of medical thought will devote their best efforts to establishing more efficient teamwork and more intelligent cooperation.

In a discussion such as the present, any review of the various points of contact between dentistry and internal medicine must perforce be superficial and incomplete. The following brief enumeration will, however, serve to point out the general lines of convergence.

When can the internist be of service to the dental surgeon? First, by advising as to the presence, identity, extent and importance of systemic disease in cases where the dentist has been led to suspect its presence. The field of examination customarily covered by the dental surgeon is usually limited to the lips and mouth. His suspicion may be aroused by abnormalities of the lips, gums, cheeks, teeth, jaws, tongue, palate, tonsils or pharynx, or perhaps by more obvious pathologic conditions of the face or head.

Syphilis is manifested in the mouth in a variety of ways. The buccal mucosa may be the site of a primary lesion, of mucous patches during the secondary stage, of gummatous ulcerations in the tertiary period, or of leukoplakia which is frequently syphilitic in origin. Not even the most experienced syphilographer will claim to positively identify the mouth lesions of syphilis without more thorough examination, and usually serologic tests.

The notched and pegged teeth, characteristic of heredospecific infection, occasionally occur in the absence of this disease, and are due to other local or general causes. Hutchinsonian teeth in and of themselves are not pathognomonic of hereditary syphilis, and when teeth of this description are found a more general examination is indicated. Furthermore, not all cases of hereditary syphilis display typical Hutchinsonian teeth.

Separation of the teeth may be due to acromegaly.

As a matter of fact, where faulty dentition cannot be accounted for by local pathology, further search in the field of internal medicine is usually indicated.

The dentist has good opportunity to observe the darkened gum margins characteristic of lead poisoning.

At not infrequent intervals the dental surgeon is consulted by his patient for the treatment of bleeding gums and the various causes for this condition should be borne in mind. General diseases sometimes associated with bleeding gums are scurvy, myelogenous leukemia, lymphatic leukemia, particularly acute lymphatic leukemia, Hodgkin's disease, pernicious anemia, aplastic anemia, splenic anemia, hemophilia, purpura, syphilis, mercurialism, iodide poisoning, phosphorus poisoning, arsenic poisoning, lead poisoning, and febrile or asthenic states accompanied by sordes.

Bleeding gums may accompany local conditions such as injury by tooth brush, dental caries, tartar, pyorrhoea alveolaris, alveolar abscess, papilloma, epulis, myeloid sarcoma,

epithelioma, actinomycosis, aphthous stomatitis, ulcerative stomatitis, gangrenous stomatitis, tuberculous gingivitis, erythema bullosum, dermatitis herpetiformis, and pemphigus.

None could require that the dental surgeon be enough of an internist to recognize all these conditions, but he should be sufficiently conversant with the work of the internist to *recognize the advent of a diagnostic problem requiring solution.*

Foul breath is not alone due to pyorrhoea or other infection within the mouth. It occurs in atrophic rhinitis, septic tonsillitis, Vincent's angina, cancer, septic lung infections, severe toxic conditions, particularly those affecting the gastro-intestinal tract and peritoneum, chronic gastritis, and after the ingestion of certain substances such as garlic, onions or paraldehyde.

The lips may be affected in herpes, lupus, lichen planus, urticaria, psoriasis, syphilis, herpes zoster, eczema, epithelioma, impetigo, Fordyce's disease, and other more rare conditions. Furrows or rhagades at the corners of the mouth should always arouse suspicion of congenital syphilis.

Pigmentation within the mouth, normally seen in colored individuals, is met with in Addison's disease, arsenic poisoning, and less frequently in pernicious anemia and cachectic diseases.

The causes of excessive salivation are numerous. It may be a simple nervous or hysterical ptyalorrhoea. It may be due to medicines or drugs such as mercury, iodides, potassium chlorate, phosphorus, arsenic or aconite. It frequently occurs in general stomatitis. It may accompany mechanical difficulties in swallowing, as in mumps, peritonsillar abscess and fracture of the jaw, or paralysis of deglutition in various neurologic lesions. It may follow irritation of the fifth nerve as by a jagged carious tooth, a rough filling, an ill-fitting plate, a foreign body in the gum, a gumboil, a salivary calculus, a ranula. Finally, it may follow gastric reflexes as in dyspepsia, gastric ulcer, etc.

Gumma, carcinoma, diphtheria, tuberculosis and streptococcus infection occasionally involve the palate, particularly the soft palate.

Swelling of the jaw may be due to injury, inflammatory affections, malignant or benign tumors, acromegaly or leontiasis ossea.

Trouble with the tongue should be quickly recognized. The smooth shining, glistening atrophic tongue of pernicious anemia appears earlier in that disease than does the anemia itself, and is more constant than any other sign or symptom except gastric anacidity. In 64 per cent of cases of pernicious anemia the appearance of the tongue is typical, and in an additional 19 per cent it is suggestive. I have on many occasions first been led to suspect the presence of this disease by observation of the tongue. This finding is not diagnostic but calls for further study.

The beefy red, angry looking furrowed tongue of pellagra is again quite distinctive, and may occur in the absence of skin lesions. The tongue of sprue is frequently not unlike that of pernicious anemia. Tuberculosis and cancer of the tongue require careful differentiation from each other and from syphilis. Ulcers may also occur on the tongue in ulcerative stomatitis or from chronic traumatization from a jagged tooth. Any chronic ulceration in the mouth calls for a detailed medical examination.

Again the physician may be of service to the dentist in a consultative way by correlating the local requirements as recognized by the dentist with the general conditions and needs. Thus, not every root abscess calls for tooth extraction. Where apical infection is present, systemic poisoning and symptoms may result. On the other hand, many individuals go through life carrying undoubted infection around the roots of teeth or in the gums without developing general disease. Several factors other than the mere presence of infection play a part in determining the production of systemic disease. Among these are the abundance of blood and lymph supplies to the infected areas, the extent of the local barrier against spread, and the patient's general resistance and immunity.

The dental surgeon frequently must decide whether he should sacrifice infected teeth which are still fairly serviceable, or which are needful for prosthetic work. It is the duty of the internist to advise with the dental surgeon after a careful general survey, as to the necessity of removing the supposed focus of infection.

In yet a third way can the internist be of service to the dental surgeon. The increasing use of local anesthesia and the frequent employment of nitrous oxide gas has nearly

done away with the use of ether or chloroform in dentistry. Nevertheless the oral surgeon occasionally has need of this form of anesthesia. The more progressive surgeon at present refuses to subject his patient to the unquestionable dangers of a general anesthesia without preliminary examination by a competent internist, of the respiratory tract for acute or chronic infection, the heart for valvular disease or myocarditis, the vascular system for dangerous hypertension or arteriosclerosis, and the kidneys for their functional efficiency. It is safe to prophesy that before many months have elapsed satisfactory tests of the functional capacity of the liver will also have been elaborated which will be of considerable value in recognizing those cases which are predisposed to shock following operation.

The necessity for an examination of this sort preliminary to gas anesthesia can best be guaged by the frequency of post-anesthetic accidents.

When can the dental surgeon be of service to the internist? First, by advising as to the extent and the importance of local pathology in relation to systemic disease. It is the duty of the internist doing diagnostic work to recognize the presence or absence of pathology in infected tonsils, infected sinuses, infected gums, and apical abscesses. But the internist who relies entirely on his own knowledge and ability to make a final diagnosis in every case of this nature will make many errors. He must recognize his limitations in fields outside of his own specialty, and where there is doubt as to the accurate diagnosis his duty to the patient requires that he request a consultation.

In diseases apparently due to focal infection, where the cause of the trouble might be in the gums or teeth, or might equally in the individual case be due to infection in some other part of the body, the internist or diagnostician will do well to consult with a competent dental surgeon as to the relative importance of the dental findings.

Second, the dentist may be of service to the internist by cooperating in improving or removing local pathology in the mouth in a manner best calculated to improve the general of systemic pathology. The physician has not done his entire duty when he demands that apical abscesses be treated by tooth extraction. There should be free discussion with the specialist in dentistry as to how thoroughly the infection should be removed, and what facilities there are for artificial reconstruction of the articular surfaces. There should be careful consideration as to the amount of benefit to be expected as compared with the amount of mutilation done.

Take for example an individual past middle life, wearing an upper plate, and with several pivot teeth in the lower jaw, half of which show apical absorption. Four or five good functioning teeth remain,—sufficient for fairly satisfactory mastication. The case is discussed in detail with the dentist. He advises that for satisfactory results all of the front teeth should be extracted, including the two or three pivot teeth without apical absorption. The patient is very particular about her appearance and desires, if possible, to keep the teeth as they are. The upper plate has never been quite comfortable, and has been a source of considerable annoyance. Undoubtedly the local condition will not be as satisfactory after tooth extraction. A decision must be reached after an evaluation of the benefit to be expected and a consideration of the dangers of non-removal of the infection. If the patient, past middle life, is affected with a low grade chronic arthritis or hypertension, which is moderately incapacitating and at best only slowly progressive, the probable improvement in pathology may be so slight as to favor non-interference. If, on the other hand, the clinical symptoms are of early angina pectoris, or recurrent acute polyarthritis, sacrifice of the remaining teeth in an attempt to limit the progress of the disease would be justifiable.

The dentist may aid the physician by removing sources of irritation, causing local disease which the latter has been called upon to treat. Examples may be found in dental ulcers of the tongue or in trigeminal neuralgia due to buried snags.

He may aid by repairing mechanical defects which have been found to cause disease elsewhere within the body. Thus, many cases of chronic gastritis may be traced to insufficient molar surface and consequent faulty mastication and "bolting" of food.

The value of group medicine has been demonstrated beyond cavil. It is only in this method of practice that the sum of all of the fractions representing the isolated specialities, when

combined, will form an integer indicating complete and satisfactory service to the patient.

The secret of successful group practice lies not in the number of specialists examining the individual patient, but in the correlation of the various findings, their integration into a unified diagnosis, and in the development of a rational plan of comprehensive but individualized treatment. From the nature of his specialty the internist must be responsible for the proper integration of the work. No group practice can be truly successful which does not utilize whenever indicated the services of the dental surgeon. It has been my aim in this paper to describe the manner in which we have found that such cooperation can be best acquired.

To accomplish this it is not necessary that the dentist be a member of a group. In fact it is often better otherwise. As a rule, individuals have their own dentist whom they prefer to any other. It is the duty of the physician, then, to cooperate with the patient's dentist, to the best of his ability.

It has been only after graduation that the dentist and the physician, each following his chosen path, have wandered apart. In the under-graduate work many of the courses of instruction are quite similar. Many of the instructors are the same in both schools. Often, indeed, both have pursued their studies under the same roof. There exists a certain community of interest and of purpose, which, in the practice of non-cooperative medicine and dentistry, has been lost to view. With the return to closer co-ordination in the fields of medicine, the interdependence of these and all other specialities will again be recognized and will be strengthened, with mutual benefit to all concerned.

St. Elizabeth's Hospital.

DIAGNOSIS AND X-RAY TREATMENT OF TOXIC GOITER WITH REPORT OF FIVE CASES.*

By W. E. KILLINGER, A. B., M. D., Victoria, Va.

We are all familiar with the modern trend of thought regarding the etiology of the toxic goiter but, interesting and suggestive as it is, there is nothing in our accepted theory regarding cause that explains its greater incidence, unless it be some factor in our modern civilization,—the strain and restless agitation and the over-crowded day, the more wide spread employment of women, for toxic goiter is almost limited to woman; some factor that makes greater demand on the function of the thyroid than formerly. C. H. Mayo has said: "While not the only factor in influencing the rate at which we live, the thyroid probably has more to do than any other substance with the governing of the speed at which energy is produced in the body." The relationship of goiter to metabolism is sufficient evidence of the importance of the gland as a factor in the up-keep of our vitalizing forces. Infections such as pyorrhoea, tonsillitis, sinusitis, etc., are suggestive but none of these are peculiar to the civilization of today.

To deal effectively with a thyroid disturbance, we must carry in mind the physiological basis for the symptoms of the toxic goiter. In a very large measure these symptoms are traceable to the disturbance of the involuntary nervous system, with its dual representation in the autonomic and sympathetic systems. In the former, the 3rd, 7th, 9th, 10th, and 11th cranial nerves, practically every organ except the brain is represented by this dual supply. The autonomic are stimulative in character, the sympathetic inhibitive in action. If this is translated into symptoms, we have dryness of skin, mouth and eyes, fatigability, dilated pupils, anorexia, etc., as evidences of inactivity of the autonomic or stimulatory system. We reverse the conditions and have moist eyes and skin, fast heart, increased blood pressure, looseness of bowels and tremor as evidences of increased action of the autonomic system. These facts suffice to illustrate the necessity of viewing the question of treating thyroid conditions, not from the narrow viewpoint of a diseased isolated gland as of a mammary carcinoma, but with a clear conception of the universality of the thyroid's influence on the cell metabolism through the body.

The cases reported in this paper have been treated with X-ray combined with rest, with the removal of a focal infection where one was determined. But I do not mean to infer that the management of the toxic goiter belongs to X-ray therapy alone. In fact, we all feel that when the chemist reveals to us the activating agent which causes the characteristic hyperplasia of the toxic goiter, the

*Read at the meeting of the Southside Virginia Medical Association at Victoria, September 12, 1922.

missing link as it were in our chain of facts and fancies, a remedy will be found that will correct the hyperplasia, without resorting to either surgery or radiation.

In reporting such a limited number of cases without sufficient after observation, I realize no definite conclusions can be drawn, still certain important facts can be impressed, and foremost among these is the diagnosis of the toxic goiter. On first thought this might not appear difficult in a disease that has such pronounced and peculiar signs and symptoms. But we find that certain cases of neurasthenia and heart disease are extremely hard to differentiate from toxic goiter.

These cases require in addition to a careful history, physical examination and diagnostic laboratory methods; repeated examinations by the foregoing methods. Of course when we find all four of the cardinal signs, an accurate, diagnosis is not so difficult, but with toxic goiter we rarely see exophthalmus, in fact we see many cases with no eye signs at all. Exophthalmus, when associated with the other signs of the toxic goiter, makes the diagnosis evident; but much more frequently than exophthalmus we find a slight stare, which is generally associated with the widening of the palpebral fissure, the so-called Stellwag sign. Of the other eye signs, that of the lagging of the upper lid when the eye is rotated downwards, von Graefe's sign, is the most important.

Great care must be exercised in the diagnosis of enlargement of the thyroid in these borderline cases, as a certain amount of enlargement is physiological during menstruation. Girls with long thin necks and a prominent isthmus will frequently show an enlargement of the thyroid when the same gland would not be visible were there a moderate amount of fat present. Again, in very fat people, we find a roll of fat running transversely across the neck directly over the thyroid, and located between the folds of the skin.

The tremor of hyperthyroidism, while rather marked in some cases, is clearly related and often hard to differentiate from the tremor common in neurasthenic conditions. It is generally more marked, coarser and less under control in the hyperthyroid states. The tremor of the neurotic is distinctly influenced by mental conditions.

Various heart lesions will give a tachycardia, but if it is due to a heart condition we will usually find at least one of the following signs: enlargement, dystolic murmur, primary disorder of the heart beat, a history of heart failure or syphilitic infection.

The weakness of hyperthyroidism is more pronounced and clean-cut than in other related conditions. The weakness is so pronounced that it forces itself upon the mind of the patient, usually reluctant to admit it. The reverse is generally true with neurasthenia.

Of all the clinical symptoms the emotional disturbances are the most difficult to diagnose. A hyperthyroid patient is in a state of emotional over-action. The mind and body cannot become adjusted to a state of repose. The emotional state is largely one of irritability.

Some of the later laboratory methods which help in the differentiation of borderline cases, especially in the early stage, are increased metabolic rate, thyroid feeding, Goetsch test, and decreased sugar tolerance. Means and Aub state that in 224 observations on toxic goiter and 18 cases of non-toxicity, the toxic cases, judged clinically, run nearly parallel with the rise in metabolism. The estimation of the metabolic rate of a patient is the most accurate laboratory method in differentiating mild cases of hyperthyroidism from conditions which simulate it. The great drawback at present to this valuable test is that it is very difficult for even the experienced to obtain accurate readings. The thyroid feeding is probably more practicable, but it aggravates an already dangerous condition.

The employment of X-ray in the treatment of goiter dates from 1898. At that time the mechanical limitation made the fractional dose method with low penetration compulsory; and even with this technique many brilliant results were reported. Pfahler in 1916 reviewed the literature bringing up to date the X-ray therapy of toxic goiter and the results of his work. Holmes reported the results of roentgentherapy of toxic goiter in the Massachusetts General Hospital. Both these men emphasize the inadequacy of the low voltage fractional dose method, as compared with modern technique. The employment of X-rays produced by high voltage and passed through heavier filters marks a distinct step forward in the treatment of toxic goiter.

The five cases reported in this paper were

of the hyperplastic type, and in each case a careful history was taken, thorough physical examination made, and necessary laboratory methods employed. Metabolic readings were made in the beginning, after three treatments, and after the disappearance of symptoms, where the symptoms disappeared. Especially diligent search was made for a focus of infection, and what was thought to be the etiological focus was found in four of the five cases. The infection was removed before or during the course of the treatment.

Report of Cases

Case No. 1. Mrs. W., white, married, aged 31. Extremely nervous past four years, has lost 25 pounds, tires on least exertion, appetite poor, bowels loose, profuse sweating at night. Past two months has been too weak to stay out of bed more than an hour or two at one time. Has noticed an enlargement of the thyroid the past twelve months.

Positive physical findings. Patient poorly nourished, skin moist, marked tremor of hands, thyroid moderately enlarged, left lobe more than right. No eye signs. Tenderness in left lower quadrant. Pulse rate 94. Leukocyte count 9,200. Blood sugar after glucose infusion .1%. Basal metabolism 35 plus. Infected left tube and ovary were removed. After three X-ray treatments, combined with rest in bed, pulse rate was 80, no tremor, basal metabolism 23 plus. After this, patient was allowed to take a moderate amount of exercise. After six treatments there was still a slight enlargement of the thyroid, basal metabolism 15 plus. She was weak at that time, but at present feels well and does all the house work. She has been discharged seven months.

Case No. 2. Mrs. B., aged 24, married. Has been nervous past year, and the conditions has become much worse the past two months, is very weak and tires easily, she nevertheless tries to do the house work.

Positive physical findings. Both lobes of thyroid uniformly enlarged; no enlargement of the isthmus. Pulse rate 91; metabolic rate 38 plus, moderate tremor. Blood sugar after glucose meal .1%. Patient continued to work while taking treatments. After four exposures no symptoms remained. She is in excellent health at present, and has been discharged five months. This case was of one year's standing, to the knowledge of the patient. No definite focus of infection was found; however her tonsils, which were enlarged at time of examination, were greatly reduced in size by the heavy exposures over the lobes of the thyroid.

Case No. 3. Mrs. S., married, aged 36. Has one brother and one sister afflicted with goiter. She has noticed the enlargement of the gland for the past three years and at present it interferes with breathing when she is lying down. She has noticed her hands trembling for the past eight months, and the past few months has been unable to sew or do any fine work. She had noticed that she tires much more easily than usual the past year. Very little appetite. Said she was conscious of her heart beating all the time, and that it seemed to be running away.

Positive physical findings. Slight exophthalmus. Stellwag's sign positive. Teeth in bad condition, thyroid markedly enlarged, left lobe more than right. There seemed to be a slight enlargement of the thymus in this case. Some tenderness over the gall bladder. Reflexes exaggerated. Blood pressure 108-60, pulse rate 104. No sugar tolerance test was made. Metabolic rate 40 plus. After five treatments pulse rate was 90, just a perceptible tremor. Basal metabolism 20 plus, very little change noticed in the size of the thyroid. Patient was very optimistic and said she felt much stronger. She was given another treatment, but still has an enlarged gland. However, she does all the house work now.

Case No. 4. Mr. W., aged 33, farmer. Led an active life until one year ago; at that time began to feel weak and nervous, weakness has grown progressively worse until at present he can do very little physical labor without becoming exhausted. He has noticed an enlargement of the thyroid the past six months, and for the past month he has been so nervous that he cannot hold a glass of water without spilling it. He has also been bothered with diarrhoea the past month. Some night sweats, not marked.

Positive physical findings. Well developed, poorly nourished, very nervous, constant tremor of hands. Moderate exophthalmus. Positive Stellwag's sign. Teeth in very bad condition. Thyroid markedly enlarged, right lobe more than left. Pulse rate 100. Leukocyte count 10,000. Sugar tolerance decreased. Metabolic rate 48 plus. Knee jerks exag-

gerated. This was the most typical case in the series. Bad teeth were removed and then treatments started. After the third treatment, the tremor was greatly improved, the pulse rate was normal, the basal metabolism reading 23 plus. He said he felt fine and could plow all day. At this time the treatments had to be suspended for a short while due to a slight burn over the right lobe. He seemed to be unusually susceptible to the rays, and was the only patient treated that experienced any difficulty in this way. After several weeks the exposures were resumed, and at present he states that he is perfectly well. The metabolic rate is within the bounds of a normal reading. He still has a slight enlargement of the right lobe, and is still under observation.

Case No. 5. Mrs. H., married, aged 29. Has always been thin and rather nervous. Past three years the nervousness has greatly increased. For the past year she has been bothered with a constant aching pain in the back, has also noticed a slight enlargement of the thyroid. Has lost much weight—20 pounds in the last seven months. Tires easily. Noticed that her urine is bloody at times. At present she cannot be up more than two or three hours at a time.

Positive physical findings. Very poorly nourished, skin moist. Thyroid moderately enlarged, left lobe more than right. Moderate tremor of hands. Marked tenderness over the left kidney. Metabolic rate 42 plus, pulse rate 98. Pus and blood in the urine. Leukocyte count 10,200. Cystoscopic examination showed a pyelitis of the left kidney, colon bacillus infection. Both X-ray treatments and irrigations of the pelvis of the kidney were started immediately. At the end of three exposures, there was very little tremor. Basal metabolism 26 plus. Pulse rate normal. By this time the pyelitis had cleared up under the irrigations. Two more exposures were given, and she was discharged with no symptoms; there was, however, a slight enlargement of the thyroid at this time. She is doing all the house work at present, in addition to taking care of a baby. The thyroid is getting smaller. She is still under observation.

All the ambulatory patients were advised to rest as much as possible during the course of treatment.

The following technique was used:—10 inch spark gap, 6 m.m. aluminum and one thickness of sole leather filter, 8 inch anode skin distance, and six M. A. of current for 12 minutes over each area, treating three areas; one over each lobe of the thyroid, and one over the thymus. Dose repeated in three weeks. Care was taken not to expose the trachea and larynx on account of the involvement of the isthmus.

In suggesting this type of treatment for toxic goiter, I feel that it has certain advantages over other forms of treatment, in that there is no surgical shock, consequently the mortality is very low, and that it can be employed in inoperable cases, also in conjunction with surgery. X-ray therapeutists are criticized by surgeons because of the adhesions formed by long heavy exposures. But these adhesions are said not to be detrimental to operation, if it becomes necessary. Pfahler and Holmes both state that this is an advantage in that it permits an almost bloodless operation.

THE WARING SUCTION TONSILLECTOMY.

By J. B. H. WARING, M. D., Blanchester, Ohio.

When we consider the truly formidable array of instruments for operative removal of the tonsils, which have been presented in recent years, together with the varying techniques and modifications of this and that technique, with which we are greeted in the professional press from time to time, one is somewhat hesitant and apologetic in the presentation of still another method for surgical removal of the tonsils. It is true, however, that in the above named method no new instruments are required over those already in more or less extensive use. The very multiplicity of instruments and methods for operative attack upon the tonsil problem would tend to indicate, however, that our methods to date have certain inherent defects or difficulties in technique, which tend to retard their more general adoption: and thus perhaps retard the production of more uniformly good tonsil work. In the hands of experts, most any method gives us good results when that method has been worked out by the given operator in many hundresd of cases. Largely then the method he is accustomed to, the method he uses in his daily work, is the best method for the given expert.

We are confronted with the fact, however, that tonsillectomy is not entirely in the hands of the skilled nose and throat man—far from it as a matter of fact. The general surgeon attacks the tonsil in a most nonchalant manner as an operation of minor import—as really a piece of minor surgery beneath the dignity of a surgeon of attainment, except for the fee in it; and yet some of the worst end-results I have seen have been operated by general surgeons of wide repute (as general surgeons). I think we should all strive to have tonsillectomy regarded as more of a major procedure, equally, if not more difficult of proper execution than the usual appendectomy. As it is, however, the tonsil is the object of attack not only by the nose and throat specialist and the general surgeon, but equally so by the general practitioner; especially so by the ambitious young physician of today. Yes, they all do tonsil work.

Inasmuch as this is the situation today, it may be relevant to invite attention to a procedure in tonsillectomy,—new, so far as I have been able to ascertain, which offers to the profession generally a simple, safe, rapid and practically bloodless method of tonsillectomy.

In a considerable use of tonsil suction tubes for diagnostic and therapeutic purposes on various types of tonsils, I was impressed not only with the mechanical cleansing of the tonsils by the suction tube, but more especially with the ease in which even deeply submerged tonsils were drawn out of their beds and into the mouth of the glass tonsil suction tube and held there while the suction was on.

Pus, caseous masses and ill-smelling purulent exudate were drawn out of the tonsil crypts and into the suction tube,—in other words, a gross mechanical cleansing of the tonsils of much potentially infective material, which otherwise would be swallowed, or more or less absorbed into the general circulation. From my observations, I believe this "vacuum cleaner" mechanical cleansing of the tonsils could well be incorporated as a preliminary step in technique, applicable to any and to all methods of tonsil removal.

At first I used the ordinary Hurd glass tonsil suction tubes, of varying diameters as the size of the tonsils, and I found that the deeply submerged and adherent tonsils were drawn out of their beds and held in the mouth of the suction tube far more effectually than any of the numerous tonsil forceps I have used. There was no laceration or shredding of the tonsil tissue, as so often happens in the effort to obtain a satisfactory grasp with tonsil forceps, and having them pull out time and again. And yet, as desired, the grasp on the tonsil could be instantly released by simply disconnecting the rubber tubing from the suction tube; and just as easily re-grasped by suction. Visibility was another feature which appealed to me. You could see what you were doing. There was no groping in the dark, so to speak, as so often happens in the course of ordinary tonsil work, with a throat full of mucus or blood. When general anesthesia was used, or local for that matter, a vacuum bottle could be inserted at any convenient point in the circuit of tubing back to the suction pump, and the throat rapidly cleansed of blood or mucus by suction aspiration as often as necessary. The same glass suction tube can be used for this, as for the tonsil work proper.

The tonsillectomy method which I shall describe is, of course, applicable to either local or general anesthesia. Its rapidity of action renders it of especial value in local work with nervous patients, and it also shortens the time necessary under general anesthesia.

The ordinary glass Hurd tonsil suction tube may be employed, although I have designed a special tube* for this work, which obviates the difficulty sometimes encountered of sliding your loop or snare wire easily over end of suction tube and on to base of tonsil.

Under general anesthesia, or local as the case may be, an appropriate sized Waring or Hurd tonsil suction tube (glass) is connected by rubber tubing to a Yankauer or any other good electric pump suction apparatus. In the circuit is incorporated a glass vacuum bottle of about a quart capacity, at any convenient point, for use as a reservoir in suction cleansure of the throat of blood and mucus, from time to time, as may be indicated.

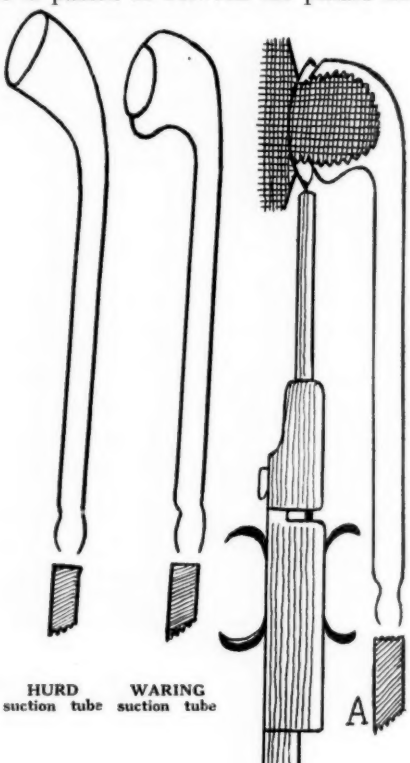
The operation is essentially a one-man job, and except for an assistant to administer a general anesthetic, no other assistance is required.

Any of the modern loop or ringed instruments are applicable, such as the Sluder, Beck, Meding, etc., or the open snare can be used just as well, and in some ways better. At present I am using the open snare on a Beck-

*The suction tube sets may be obtained from The M. I. M. Company, 634 Woodward Building, Washington, D. C.

Pierce tonsillotome, with about a No. 8 snare wire.

The glass tonsil suction tube is passed through loop of the snare, or tonsillotome, which is then allowed to hang freely suspended from shaft of tube until used. A suction tube of sufficiently large mouth to include the tonsil having been selected, the suction apparatus is regulated for enough suction to obtain a firm grasp of the tonsil, and under direct inspection the mouth of suction tube is passed in between the pillars and the



Tonsillectomy by the Waring suction method. Half approximate size.

(diagramatic)

Tonsil is engaged firmly in mouth of glass suction tube. Snare loop slipped over end of tube and on to base of tonsil, in readiness to enucleate. Beck-Pierce tonsillotome in use.

A—Rubber tubing slipped over end of suction tube and leading to suction pump.

tonsil engaged. The suction pump is now turned on. It will be seen that the tonsil is now drawn completely out of its bed and firmly in the grasp of the suction tube, which, being of clear glass, enables the operator to see exactly what he is doing. There is no danger of including the uvula, or damaging the pillars, as sometimes happens in other operative methods. Lightly steadying the suction tube in one hand, the snare loop is carried down over end of suction tube and on to base of tonsil, the left hand for the right tonsil, and the right for the left tonsil. With my improved tubes, the snare loop slips down over base of tonsil very easily as compared to when the Hurd tube was used at first, and the tonsil enucleated by tightening down the snare rapidly, or better by slowly screwing down as is possible in the Beck and similar instruments. This makes a practically bloodless operation, and it will be found the tonsil is enucleated rapidly and cleanly, with smooth fossae and with no damage to adjoining structures. The same procedure is carried out with the second tonsil.

After treatnent may follow whatever routine the operator is accustomed to. There is practically never any primary bleeding to speak of, and I have never had secondary hemorrhage from the method; the throats rapidly heal over, with a minimum of discomfort to the patient. I usually give calcium lactate in appropriate dosage several days beforehand—a coagulation-time test can be used to advantage in all cases prior to operation—and for any oozing in fossae after operation I have found Monsel's solution in glycerin a very effectual haemostatic.

Advantages of the operation over existing techniques are that it is so simple the operator of limited experience even can operate rapidly, safely and with uniformly good results. This cannot be said of some of the older methods, which require considerable training and experience, before one is competent in their use. It is practically bloodless in all cases, so that no time is lost under general anesthesia in haemostasis; and further, it does not require the elaborate armamentarium sometimes seen in tonsillectomy. The method is of especial value in the deeply submerged type of tonsils, so difficult of attack under ordinary methods.

109 *East Main Street.*

WIRE RING IN ESOPHAGUS: REMOVAL.

By ELBYRNE G. GILL, M. D., Roanoke, Virginia.

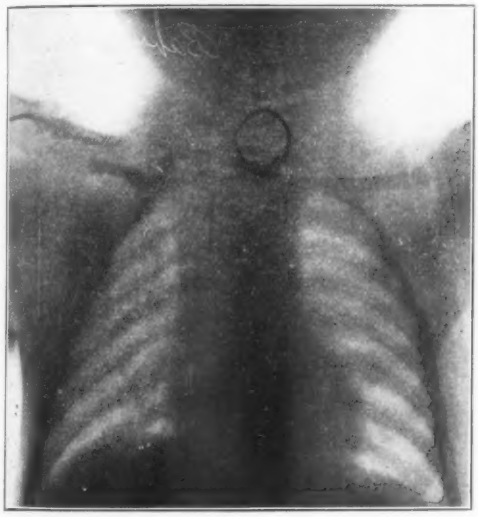
Patient, W. H. S., age seven months, referred to me, August 3, 1922, by Dr. W. W. Chaffin, of Pulaski, Virginia.

Parents gave the following history: For past two months child has been having chok-

ing spells after nursing. History otherwise negative.

I referred the patient to Dr. J. T. McKinney, for an X-ray examination and his report is as follows: "Chest shows the shadow of an opaque metallic ring lying in the esophagus, the lower border of the ring being opposite the sternoclavicular articulation. The heart and mediastinum are slightly pushed to the right side."

I sent the child to the hospital and with the use of the Jackson's small size laryngoscope and laryngeal grasping forceps I removed the wire ring without any anaesthetic, either local or general. The time of the operation one minute. Assistant Dr. F. A. Farmer.



The child left the hospital the following day, in good condition. I have heard from the parents since and the recovery has been uneventful and complete.

After receiving the rontgenologist's report and closely questioning the parents, the following fact was brought out which they did not give at first: they stated that the older children, about two months ago, were making wire rings and they remembered the baby playing with one of the rings and it was about this time the child's choking spells began.

In all cases of suspected foreign bodies in air or food passages, a careful history of the case is always important.

612 *MacBain Building.*

PROSTATECTOMY: A REPORT OF CASES, WITH SPECIAL REFERENCE TO PRE-OPERATIVE AND POST-OPERATIVE TREATMENT.*

By AUSTIN I. DODSON, M. D., Richmond, Va.
Urologist to St. Elizabeth's Hospital, Instructor in Genito-Urinary Surgery, Medical College of Virginia.

During the past three years, prostatectomy has been done on sixteen patients at St. Elizabeth's Hospital, and one on our service at another institution. They range in age from 56 to 77 years, and the duration of their symptoms from one week to fifteen years. Eleven of these men were admitted with complete retention; the remaining had a residual of from 6 to 28 ounces. There was one death from peritonitis following suprapubic prostatectomy. The remaining sixteen were discharged well. There were two cases of carcinoma, both of whom are free from symptoms of cancer, one eighteen months after operation, and the other three months. The preparatory and post-operative treatment of these patients has been in my charge, while the operations were done by Dr. J. Shelton Horsley.

Each patient is a law unto himself and his individual characteristics should be carefully studied and patiently dealt with. He should be made to feel at home and his habits interfered with as little as possible.

The first step in the preparation is the institution of drainage. In patients with ten ounces or less residual, complete drainage may be carried out at once without danger. We prefer drainage by suprapubic cystotomy. In our hands patients have had less discomfort and have made more rapid improvement with this drainage than when a catheter was retained in the urethra. A mushroom catheter can be placed in the bladder and the wound sutured around water-tight, giving excellent drainage without the discomfort of the urethritis, bladder spasm, and added danger of epididymitis resulting from an indwelling catheter. When there is a greater residual than ten ounces it should be reduced gradually, since the sudden withdrawal of large amounts of residual urine frequently results in suppression and uremia. It has been our custom to drain the bladder, then run in half the amount of sterile boric acid solution. The amount is reduced by one-fourth daily until no solution is left in the

*Read before the Southside Virginia Medical Society, Victoria, Va., Tuesday, September 12, 1922.

bladder. After completely emptying the bladder for a few days, depending upon the patient's response, constant drainage may be safely carried out. Frequently these patients have a rather marked cystitis, which is very effectively combated by the administration of large doses of urotropin and daily irrigations with supersaturated solutions of boric acid.

During this period of preparation, frequent tests of the kidney function should be made. The most satisfactory tests are the phenolsulphonephthalein, blood urea nitrogen, and the Mosenthall two-hour renal test. Each acts as a check on the other, and a more satisfactory conclusion can be drawn than when only one test is relied upon. The Mosenthall test is easy to make, and frequently gives information not obtained in the other tests. Attention has been called to this in a previous paper ("The Diagnostic Value of Analysis of of the Urine," Dodson and Ashworth, VA. MED. MONTHLY, April, 1922). We have never operated upon a patient with a phenolsulphonephthalein elimination lower than 30% in two hours or a blood urea nitrogen retention greater than 28 milligrams per 100 cc.

The next most important feature is the blood pressure. Drainage of a chronically distended bladder always results in some derangement of the circulatory system, manifested by a fall of the blood pressure. When the patient has become accustomed to an empty bladder the pressure will rise again. It will rarely be as high as before drainage was instituted, but a constant level should be maintained over a period of several days before a prostatectomy is done.

During the period of preparation the patient should be permitted to be up and around at will. He should be encouraged to drink large quantities of water. The diet should be suited to his individual taste as nearly as possible. Protein should be limited, and the diet should be almost salt-free.

The time required for preparation varies greatly with individual cases,—in our series from one week to eight months. It is not a question of how long they are to be treated before prostatectomy; a definite standard of preparedness must be required before operation is done.

J. W., colored, was admitted to the Retreat for the Sick Hospital, suffering with complete retention. His blood urea nitrogen was 50 milligrams per 100 cc. of blood, and phenolsulphonephthalein elimination was 15% in two hours. There was marked edema of his feet and ankles, and some ascites. After catheterization for about a week, a suprapubic drain was inserted. After another week very little improvement was noted. He was sent home under the care of his physician. Two months later he returned markedly improved. The phenolsulphonephthalein elimination was 35% in two hours, and blood urea nitrogen 22 milligrams per 100 cc. Prostatectomy was done, and two weeks later he was discharged well.

In the majority of cases, the post-operative care consists mainly of careful nursing. The patient should be kept in a warm bed in a well-ventilated room, free from sudden temperature changes or draughts. A large intake of water should be required. If it cannot be taken by mouth, it should be given subcutaneously. It is our custom to give every patient operated upon from one to two thousand cubic centimeters of Locke's solution subcutaneously during the first twenty-four hours after operation. The administration of this solution, containing the chemical constituents of the blood, is started when the operation is started. It is mostly absorbed by the time the patient reacts, thereby eliminating to a great extent the discomfort incident to its use. It is utilized at a time when fluid is most needed and when the patient is less apt to take it by mouth. Sufficient opiate should be given to keep the patient comfortable.

Hemorrhage, shock, sepsis and uremia are the four chief causes of disaster following prostatectomy. Hemorrhage and shock are so closely related in prostatic cases that they may be treated together. Gentleness during the operation and care in controlling bleeding before the patient leaves the table will aid greatly in preventing further trouble. Hypodermoclysis and the application of external heat are also very helpful. Should shock or hemorrhage occur, the most satisfactory treatment is a direct transfusion of blood. Direct transfusion is free from the dangerous reactions frequently met with in the citrate method, and is far superior in its results. These facts were brought out in a recent article ("Direct Transfusion of Blood," Horsley, Vaughan and Dodson, *Archives of Surgery*, Sept., 1922). The proper matching of the patient with one or more relatives or friends

for possible transfusion is a requirement that we insist upon before operation. Valuable time may be lost in securing and matching a donor when actually needed. We have made use of transfusion in three cases with excellent results.

The following case, Mr. J. W. W., aged 77, was operated upon for cancer of the prostate. He left the table in good condition, with the pulse 90. Two hours later he began to bleed rather profusely and his condition became critical. The systolic blood pressure was 75, diastolic not obtainable, pulse 160. He was transfused from his son. After fifteen minutes of transfusion his blood pressure was systolic 115, diastolic 85, and pulse 120. The patient made an uneventful recovery.

Free intake of fluids and free drainage are the best safeguards against infection. Frequent irrigation of the bladder with supersaturated boric acid solution both before and after operation is helpful. It must also be remembered that poor nourishment and the loss of large quantities of blood greatly handicap these old men in resisting infection.

With the present accurate test of kidney function, uremia should no longer exist as a complication. This feature should be determined during the pre-operative treatment.

Epididymitis, frequently a troublesome complication, can usually be prevented by supporting the testicles on an adhesive strap bridged across from one thigh to the other. When it occurs, hot applications, in addition to support, are very helpful.

Book Announcements

The Elements of Scientific Psychology. By KNIGHT DUNLAP, Professor of Experimental Psychology, Johns Hopkins University, Baltimore; Author of "Mysticism, Freudianism and Scientific Psychology," etc. Illustrated. St. Louis. C. V. Mosby Company. 1922. Cloth. 8vo. 368 pages. Price $3.50.

Ophthalmoscopy, Retinoscopy and Refraction. By W. A. FISHER, M. D., F. A. C. S., Chicago. Professor of Ophthalmology, Chicago Eye, Ear, Nose and Throat College; Late President Chicago Ophthalmological Society; Fellow of the Academy of Ophthalmology and Oto-Laryngology, etc. Published by the Author, at 31 North State Street, Chicago. Cloth. 12mo. 218 pages and index. 248 illustrations including 48 colored plates. Price $4.00.

Bibliography of Hookworm Disease. Publication No. 11. The Rockefeller Foundation. International Health Board, New York City. 1922. Paper. 417 pages.

Government Plans Physicians' Schools.

Plans have been announced for the establishment by the Veterans' Bureau of post-graduate schools for the training of government physicians in the treatment of mental diseases and tuberculosis. The school for the training of the men specializing in these diseases will be at St. Elizabeth's Hospital for the Insane at Washington, D. C., and at the Veterans' Bureau Hospital, Oteen, N. C.

Charles Street, Its History and Growth,

Is the name of a little pamphlet issued by the Charles Street Association of Baltimore, Md. The history given of the street is interesting and the booklet also gives names of some of the places at which to shop in Baltimore. This Association has headquarters in Fidelity Building.

The Association of Military Surgeons of the U. S.,

At its recent convention held at Walter Reed General Hospital, Washington, D. C., elected Col. Charles Lynch, M. C., U. S. Army, president, and Col. James R. Church, U. S. Army retired, secretary-treasurer.

The Christmas Seal Sale

Is now on and the call is again made for each one to contribute his mite, or more, to this worthy cause. This will be the fifteenth call to buy seals, the proceeds from which have done so much to stamp out tuberculosis in our midst. In protecting those who have it, we are also protecting ourselves.

In Virginia alone, last year, $54,172.97 was raised by the sale of the seals. Of this amount, $33,893.60 was returned to the various counties and cities in which the money was raised and was spent for local needs under the general direction of the Virginia Tuberculosis Association.

Buy your seals now!

Directory of Child-Health Agencies.

The U. S. Department of Labor, through the Children's Bureau, has just issued a comprehensive directory of 861 local child health agencies in the United States. These agencies are actively engaged in the promotion of child health through maternity care, infant care, and the care of the child of pre-school age.

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Editorial

Transduodenal Drainage of the Biliary System or Non-Surgical Drainage of the Gall Tract.

Any procedure offering the possibility of irrigating and draining the gall tract without a major abdominal surgical operation, with its risks, should receive fair consideration during the period of trial and evaluation. The frequency of gall tract infection, which ultimately becomes of so serious a nature as to require the opening of the abdominal wall, the gall tract and the introduction of a drainage tube therein, and the direct siphonage of infected secretions and fluids, is, indeed, very great. Operations of this sort are needed in the face of gross pathology and non-surgical procedure should not supplant surgery in this type of case. The field of usefulness for transduodenal drainage of gall tract is rather limited, it would seem, to infections of recent occurrence, before serious and marked pathology has occurred. It is merely of interest to cite experiences and to quote opinions upon its value as pertaining to the early bile-tract-inflammations, because in the more advanced and gross evidences of pathology it can be of little efficacy. But it is encouraging, at least, to feel that into the hands of practitioners and at the bedside a procedure is being favorably introduced which appears to offer a means of early diagnosis and therapy in cases in gall tract infections.

There appears to be some doubt as to the evidence that A. B. & C. samples of bile may be assigned to (1) the common duct, (2) the gall bladder and small bile radicals respectively; that the procedure may be conducted under sterile conditions; that sterile bile samples may positively indicate a non-infected gall tract. Much work must be done in the clinic and laboratory before one can justly arrive at a safe judgment that the evidence obtained by non-surgical gall tract drainage is accurate and meets requirements of scientific procedure.

It is said by one from the Mayo Clinic that it is impossible to sterilize the stomach or duodenum and, also, to pass a duodenal tube through the mouth, an incubator and habitat of bacteria, without transplanting bacteria with the tube-end. Further, it is urged that bile from a patient with chronic cholecystitis is often, if not invariably, sterile, the infection being in the wall of the viscus rather than in its secretion. In operation of gall tract, organisms were found in only 19 per cent. of gall bladders removed, according to Drennan, quoted by Hartman.*

On the other hand advocates of the method have secured good clinical results and thoroughly urge that it be used. Friedenwald and Morrison, quoted in *The Therapeutic Gazette*, May 15th, 1922, conclude, favorably, in this way:

"1. The method of biliary drainage, as instituted by Lyon, furnishes a valuable aid in the diagnosis of gall bladder infection. It is particularly valuable in that it enables us to diagnose these conditions early before evidences of complications have manifested themselves.

"2. It presents an important means of determining the presence of focal infection in the gall bladder, a condition which may be of the greatest therapeutic and diagnostic value in obscure conditions.

"3. While this method of treatment is still in its infancy and is as yet too new to draw conclusions regarding its end results, there can be no question that it furnishes us with means of affording definite relief in certain biliary affections for which hitherto radical measures have been required. It is extremely valuable in the treatment of catarrhal jaundice biliary stasis and gall bladder infections and is helpful in relieving symptoms which may still remain following gall-bladder operations."

*Hartman, Annals of Clinical Medicine, Sept., 1922.

As above indicated, probably no recent contribution to medical literature has attracted so widespread an interest in the profession, as the method of non-surgical drainage of the biliary passages, first set forth by Lyon in September, 1919.

This preliminary report has been followed by a series of admirable papers by Dr. Lyon, amplifying the method and reporting its use by him in the diagnosis and treatment of the diseases of the biliary system.

Others have taken up the work and the journals of late have abounded with literature on the subject. It has been alternately lauded and condemned, being caustically criticized by Einhorn, Crohn, Dunn, Bassler and others; while the works of Brown, Smithies, Sachs, Friedenwald, Whipple, Simon, and Sinnott have practically confirmed the soundness of its principles.

It is not unnatural that the method has attracted a wide-spread interest. Symptoms referable to the gastro-intestinal system, and particularly those of the upper right abdominal quadrant, are often confusing. It is seldom that we get a clear cut and unmistakable picture of gall bladder disease. Particularly is this true of the early infections. Here an early diagnosis would aid us materially in coping with the condition medically: before the tissues are irreparably damaged, and before the condition becomes definitely surgical.

Of course Roentgenological examination of this region is of value as a diagnostic procedure, and should always be carried out in suspected cases, but its use has been disappointing and it is admittedly lacking in its ability as a dependable diagnostic aid.

That which has been said in regard to diagnosis can also be applied to the present status of our therapy. Surgical procedure is by no means a panacea in the treatment of these conditions. Many is the patient who has undergone the dangers and discomfort of a cholecystectomy or a cholecystotomy to be seized a few months later with the symptoms from which they suffered prior to operation.

If by collecting the specimens of bile through the duodenal tube and studying each specimen grossly, chemically, bacteriologically, and cystologically, we are able to make an early diagnosis of pathological conditions in different portions of the biliary mechanism, we have taken a long step forward, and can undoubtedly deal with these conditions medically, without resorting to dangerous surgical procedure. This would be the method of choice even in patients who are good surgical risks, not to speak of those who are afflicted with cardiac and renal conditions in which surgical endeavor is impossible. Brilliant results have followed the use of this method in the treatment of catarrhal jaundice, choledochitis, cholangeitis, and cholecystitis.

Empyema of the gall bladder has been treated successfully during its acute stage by transduodenal drainage. The method has a distinct merit as a post-operative follow-up treatment, to continue to drain bile which is still infected and which is beyond the limits of surgical drainage.

Cases of so-called "biliousness" are markedly benefited by the use of the duodenal tube. In these cases we find a definitely static infected bile, which, if left to itself, would probably result in the formation of gall stones. It is not claimed that cholelithiasis is within the scope of biliary drainage. This admittedly is work for the surgeon. Is it not possible, however, by early detection of the infection, followed by frequent drainages, and such supplementary treatment as deemed advisable, to overcome the inflection and thus prevent the formation of stones?

As yet it would probably be unwise to accept all of the things the proponents of biliary drainage claim for it. It would be still more unwise, however to listen to much of the criticism heaped upon its head, or to voluntarily condemn it without giving it a trial.

The procedure is a rather simple one. The patient is instructed to fast on the night before the treatment. At 9 A. M., after the teeth have been cleaned, the mouth cleansd and the throat irrigated with an antiseptic solution, the sterilized tube is introduced. After the tube is passed into the stomach, this organ is washed clean with water and then flooded with 1 to 1,000 solution of potassium permanganate. This last process is used only in cases that show mucus. The patient is then placed on the right side and instructed to swallow an additional twenty centimeters of the tube, making seventy-five to eighty centimeters from the lips. During the following twenty minutes, swallowing efforts are practiced and, within an hour at least, the duodenal tube, in most instances, will pass into the duodenum.

The following points indicate its passage into the duodenum: (1) a change of color, a canary yellow color, (2) a clear limpid alkaline fluid, (3) failure to withdraw fluid recently swallowed, (4) duodenal tug, (5) Roentgen ray examination, (6) inflation with distended lower abdomen without eructation or gastric discomfort.

The aspirating bottle applied to the tube now expresses only duodenal secretion. After 50 c.c. of a warm sterile 33 1-3 per cent. solution of magnesium sulphate is injected into the duodenum and the magnesium sulphate later siphoned off; in a few moments bile mixed with magnesium sulphate appears. It may be necessary to again stimulate with magnesium sulphate solution before a good response is secured. The first bile is from the common duct and requires from one to three minutes and amounts to 10 to 20 c.c. This is clear, light yellow in color—(A). Next, there comes a darker bile which is more viscid: this gall bladder bile (B), amounting to 35 to 90 c.c. Following this there is a third variation in grade of bile which is thought to be directly from the bile radicals, freshly secreted and amounting to about 10 c.c. After this aspiration and irrigation of the biliary system is completed about 250 c.c. of Ringer's solution is slowly injected into the intestines for the purpose of flushing out infected material. Cultures are taken of the bile collected from each region: (1) the common duct, (2) the gall bladder, and (3) the bile radicals.

General comment upon this procedure by the internist points to the advantages to be secured by this method of duodenal contact. The procedure should be studied further in order to establish or disprove the claim to accuracy of diagnosis of a state of the gall tract from the standpoint of infection by the examination of bile:—samples obtained after the method of Lyon.

But this aside, coming from the realm of the absolute, more into that of practice, it is a very fortunate procedure that places the internist in tube-connection with the ducts draining the liver and pancreas. This procedure may also be a means of disclosing factors in gastric digestion and gastric motility of extreme importance. This is particularly true in patients beginning the disturbances of gas eructations, heart burn and dyspepsia.

In pursuing the practice of transduodenal biliary drainage, the etiology of the infection must be kept in mind. It seems that Lyon's observations indicated the primary forces of infections in these cases and were found to be infections of the "upper respiratory and digestive tracts"; "the six principal points of primary focal infections we found to be in the tonsils, gums or teeth, the posterior nares, sinuses or the bronchial tree." The five principal secondary foci are the stomach, the duodenum, the gall bladder, appendix and recto-sigmoid colon.

The searching for the etiologic factor at work in the case of bile tract infection is important. Cases of this sort should be studied from this point of view. It is not enough to improve the gastric symptoms and to relieve the patient of infections of the gall tract. At any rate, it is not enough to suspend investigation upon obtaining non-infected bile. The cause of this original infection should be sought and primary infection removed or drained.

GOOD ROADS!
If you want them, see your representatives and senators.
GOOD ROADS!

DR. GEORGE ROSS' BIRTHDAY.

Virginia doctors congratulate you upon your eighty-fourth birthday!

You have fought a good fight; you have kept the faith; and your fellow craftsmen throughout this Commonwealth greet you in admiration and affection. Your long years so splendidly spent answering the call of those who suffer and languish; your span of life, given with princely grace to the service of the sick—is truly a career of greatest success.

Your courteous and courtly bearing as a physician, your unfailing loyalty to the highest tenets of the craft, your skill as a practitioner of medicine and surgery, your high ideals of life and of character, as shown in your daily walk and conversation, are virtues which, in you, your fellow doctors revere and honor.

Dr. Douglas Freeman, the able and versatile Editor of *The News Leader*, Richmond, wrote the following editorial upon the occasion of Dr. Ross' eighty-fourth birthday. We quote it in full appleciation of this distinguished layman's tribute to our honored friend.

DR. ROSS' BIRTHDAY.

"If Richmond people ever permitted themselves to express the things they feel, traffic would be blocked tomorrow on Park Avenue opposite Shafer Street and crowds would overwhelm the house numbered 903. They would come to express their thanks to a man who has served thousands of them. They would come, on the fitting date, to congratulate one of the oldest, one of the best-known and surely one of the best-loved physicians of Richmond. For tomorrow is the eighty-fourth birthday of Dr. George Ross.

"To recall to readers the milestones in Dr. Ross' life is to list famous names and historic places. He was graduated from the Virginia Military Institute in 1859, the year of the John Brown raid, and when Jackson was an instructor. Few living men can recall as many details of the great 'Stonewall's' days at the institute as can Dr. Ross. From Lexington he went to Charlottesville, where he was awarded his medical degree in the class of 1861—the class that wanted to enlist to a man for the defense of Virginia. Throughout the war, Dr. Ross wore the gray and ministered to the wounded. When the struggle ended he came to Richmond. His name is to be found in the Directory of 1866, when his residence was at 701 East Franklin. Thence he moved to First and Franklin, where he lived until 1912. His home has been on Park Avenue since that time.

"The record of his fifty-six years of service in Richmond cannot be put in type. His high professional standing, his inspiring influence on the younger physicians, his rigid adherence to the ethics of his calling—these things are known to all Richmond. But the relief he administered to thousands who could not pay, the constancy of his attention to patients, the hope he whispered to failing ears, the loyalty he displayed to the good old cause of the South, the fidelity of his long wardenship at St. Paul's—these never can be known in their fullness. He has kept the secrets of his most splendid acts as steadfastly as he has kept the faith.

"Dr. Ross was sick this summer. The report of that fact was distress to the host that loves him. His condition now is much improved and has permitted him to ride out in a motor-car. This encourages Richmond to make of him a request when it pays tribute to him tomorrow. That request is nothing less than that he keep burning for at least another decade the light of his inspiring personality."

News Notes

The Norfolk Meeting,

Now but a pleasant memory, had a registered attendance of about 500 physicians, in addition to the ladies and exhibitors. The scientific and social features were up to the high standard always maintained by the Norfolk profession. The commercial exhibits were most attractive. The local committee of arrangements, with Dr. R. Lloyd Williams as chairman, is to be congratulated on the great success of the fifty-third annual meeting.

Most of the material having been prepared for the current issue, prior to the time of the convention, we are compelled to defer a full report of the Norfolk meeting until the December issue. The following are the new officers elected for the ensuing year: President, Dr. John Staige Davis, University; first vice-president, Dr. E. L. Kendig, Victoria; second vice-president, Dr. Charles R. Grandy, Norfolk; third vice-president, Dr. R. S. Griffith, Basic; secretary-treasurer and business manager, G. H. Winfrey, Richmond; editorial and business assistant, Agnes V. Edwards, Richmond, both of the latter being re-elected. Councilors elected from the State-at-large were Drs. Isaac Peirce, Tazewell, and Lawrence T. Price, Richmond; councilor for the fifth district, Dr. D. H. Mason, Ridgeway; seventh district, Dr. R. L. Page, Batesville; eighth district, Dr. Hugh McGuire, Alexandria. Dr. Joseph T. Buxton, Newport News, was elected to succeed himself as delegate to the American Medical Association.

The next meeting of the Society is to be held in Roanoke, the exact date to be set later by the Executive Council.

A Woman's Auxiliary

Of the Medical Society of Virginia, composed of the wives and daughters of the members, was formed at the Norfolk meeting of the State Society. Mrs. J. Allison Hodges, Richmond, was organization chairman, and Mrs. Burnley Lankford, Norfolk, organization secretary of the meeting, which was held to discuss the plans of the Auxiliary. Mrs. R. Lloyd Williams, Norfolk, was elected president for the ensuing year.

The activities of these women's Auxiliaries of the State societies have received the endorsement of the American Medical Association, and their purpose is to co-operate with existing organizations in the promotion of public health work. Twenty-eight counties and cities were represented at the Norfolk meeting and a great deal of interest was manifested by those attending. Mrs. J. Allison Hodges was appointed to represent Virginia in the Women's Auxiliaries at the next meeting of the American Medical Association at San Francisco.

There was an unusually large attendance of ladies at the Norfolk meeting, about 125 having registered. More than half of these were visitors. The entertainments for the ladies were most enjoyable and included an automobile ride to Virginia Beach, with tea at the Princess Anne Country Club, a reception by President and Mrs. E. C. S. Taliaferro, to both the ladies and men, and a luncheon at the Country Club, followed by a ride to the Naval Operating Base, where a full dress parade had been arranged for the benefit of the visitors, through the efforts of Mrs. Southgate Leigh. Mrs. Chas. R. Grandy was chairman of the ladies committee.

Special Course to be Given in Neuro-Psychiatry.

Owing to a shortage of physicians and nurses trained in Neuro-Psychiatric work, the U. S. Veterans' Bureau is offering a special course in Neuro-Psychiatry to a certain number of qualified physicians, on condition that upon completion of such a course they will continue in the service of the Bureau for a period of at least two years thereafter. The main part of the course will be given at St. Elizabeth's Hospital, Washington, D. C., and the teaching staff will be composed of men of ability in their specialties. Physicians who desire to enter the service of the U. S. Veterans' Bureau and to take this course should make application at once to the Director of the U. S. Veterans' Bureau, attention Medical Division, and make request for information concerning necessary requirements, salary while taking and after completing the course, rating, etc., as, other things being equal, members for the course will be selected in the order of their application.

The course will start on January 4, 1922.

New Members of the Norfolk County Board of Health.

Drs. S. J. Tabor, of Cradock, and C. F. Eason, of Hickory, have been appointed new members of the Norfolk County Board of Health, to succeed Drs. A. M. Burfoot, of

Fentress, and A. G. Horton, of Ocean View. Dr. Josiah Leake, of Churchland, was reappointed for another term. The other members of the Board are Charles Old, chairman of the Norfolk County Board of Supervisors, and G. Taylor Gwathmey, clerk of the court of Norfolk County.

Dr. T. M. Mann, Portsmouth, will continue as Norfolk County Health Officer.

Changes at Mt. Regis Sanatorium.

Dr. Albert E. Holmes, recently assistant medical examiner in the Veterans' Bureau, Tampa, Fla., has been appointed associate physician at Mt. Regis Sanatorium, Salem, Va., to succeed Dr. Edward Bancroft, who has accepted an interneship at Lewis-Gale Hospital, Roanoke, Va. Dr. Holmes was graduated from Vanderbilt University in 1916, and, after an interneship at Bellevue Hospital, New York City, served for twenty-seven months in the medical corps, of the U. S. Army.

Miss F. M. Nunnally, R. N., of Stuart Circle Hospital, Richmond, the new superintendent of nurses at Mt. Regis, was for three and a half years superintendent of nurses at W. Va. State Tuberculosis Sanatorium, at Terra Alta. After this she served as assistant superintendent at C. & O. Hospital, Huntington, W. Va., coming to Mt. Regis from Rockingham Memorial Hospital, Harrisonburg, Va., of which hospital she was superintendent.

Mrs. Mary Whittington Brown, who is in charge of the dining room and kitchen at this hospital, is a graduate dietitian from Columbia University, and has had considerable experience at the Post-Graduate Hospital in New York.

Two Chiropractors Fined.

Two chiropractors were fined $50 and costs recently, in the police court at Winchester, Va., for "unlawfully practicing medicine without first obtaining a certificate to practice from the State Board of Medical Examiners," as required by law, and $50 and costs on a charge of practicing medicine without first obtaining a license. Appeals were noted in the corporation court.

The warrants were issued by Dr. P. W. Boyd, a member of the State Board of Medical Examiners.

The Fayette County (W. Va.) Medical Society

Held its regular meeting at Montgomery, October 11, Dr. Horace L. Goodman, of McKendree, W. Va., in the chair. Papers were read by Drs. Ralph W. Stoneburner, Montgomery; C. S. Smith, Beckley; Kenneth D. Graves, and Wm. B. Porter, Roanoke, Va., and Robert K. Buford, Charleston. After the program, a splendid banquet was tendered by the staff of Coal Valley Hospital and was greatly enjoyed. Among those present from a distance were:—Drs. K. D. Graves and Wm. B. Porter, of Roanoke, Va., Arthur S. Jones, Walter E. Vest and J. C. Matthews, of Huntington, W. Va., Robt. K. Buford, of Charleston, W. Va., and C. S. Smith and A. H. Grigg, of Beckley, W. Va.

Changes at Rockingham Memorial Hospital.

Miss Florence R. Wells, R. N., of Clarksville, Va., a graduate of the Rockingham Memorial Hospital, Harrisonburg, Va., has been elected superintendent of this hospital. She has had post-graduate work at Sloane Hospital, Columbia University, New York City.

Miss Helen Echols, R. N., of St. Luke's Hospital, has accepted the position of assistant superintendent and instructor at this hospital.

Miss Mary D. Fairchild, R. N., of Memorial Hospital, Richmond, remains as night superintendent, which position she has held for the past year.

Mr. C. A. Funkhouser, of Harrisonburg, has been appointed as business manager of the Rockingham Memorial Hospital, since the resignation of Mr. Vernon Zirkle.

Overcoat Left in Norfolk.

An overcoat, bearing the clothier's label of Kirk-Parrish, Richmond, was left on Wednesday evening in the hall of the Medical Section in the Shrine Temple, during the meeting of the Medical Society of Virginia in Norfolk. Information about this may be obtained from the Society's offices in Richmond.

The Seaboard Medical Association of Virginia and North Carolina

Will meet in New Bern, N. C., December 5, 6 and 7, 1922. An elaborate program will be presented, features being Symposia on Cancer, Pneumonia and Infantile Diseases. This society enjoys the distinction of having one of the largest average attendances for membership of any medical society in the United States. The social features will be varied and many, one being an old-fashioned Southern "Pork and Chittlings Barbecue." Officers of the Association are Dr. Joseph L. Spruill, Sanatorium, N. C., president; Dr. George A.

Caton, New Bern, N. C., treasurer, and Dr. Clarence Porter Jones, Newport News, Va., secretary.

Dr. Robert Matthews,

A graduate of Trinity College, University of North Carolina, and the Medical School of the University of Pennsylvania, after post-graduate work in the hospitals of Philadelphia and a year in Europe, recently located in Taylor Building, Norfolk, Va., where he is engaged in the practice of general medicine and children's diseases.

Dr. G. C. Parker,

Formerly of Norfolk, Va., is doing neuro-pathological work in the Philadelphia General Hospital, having entered there for a service of three years.

The American College of Surgeons,

At its tenth convocation in Boston, the latter part of October, elected Dr. Albert J. Oschner, Chicago, president, and re-elected Dr. Franklin H. Martin, also of Chicago, director-general. The following doctors from Virginia were elected to membership: Drs. James H. Culpepper and Charles C. Smith, Norfolk; Courtney Edmond, Clifton Forge; J. F. Geisinger, Emory Hill and H. Page Mauck, Richmond; Gray G. Holladay, Portsmouth; Alfred P. Jones, Roanoke; James H. Morrison, Lynchburg, and J. E. Rawls, Suffolk.

The Virginia, Maryland & District of Columbia Medical Society

Will hold its semi-annual meeting at Raleigh Hotel, Washington, D. C., November 22. The usual good program prepared by this society will be enjoyed. Dr. Wm. L. Lewis, Kensington, Md., is president; Dr. Robt. Scott Lamb, treasurer; Dr. Wm. T. Davis, recording secretary, and Dr. Joseph D. Rogers, corresponding secretary. All of the last named are of Washington, D. C.

Married.

Dr. Hunter McClung, Lexington, Va., and Miss Nancy Bourne Wayland, of Crozet, Va., October 11.

Dr. John Morton Davis, Lynchburg, Va., and Miss Dorothy Talbott Thomas, Danville, Va., November 18.

Mr. Edward Roger Gallalee, Portsmouth, Va., and Miss Elizabeth Watkins Drewry, November 7. Miss Drewry is a daughter of Dr. and Mrs. William F. Drewry, of Petersburg, Va.

Surgeon Holcombe McG. Robertson,

U. S. Public Health Service, has been assigned to duty in Richmond and is located at the State Board of Health headquarters, 1110 Capitol Street. Dr. Robertson is in charge of Co-operative Rural Health Work in the State and succeeds Surgeon Warren F. Draper who has been transferred to Washington, D. C.

Surgeon Warren F. Draper,

U. S. Public Health Service, who since the spring of 1919 has had charge of Co-operative Rural Sanitation Work in Virginia, has been assigned to duty as Assistant Surgeon General in Charge of the Division of Domestic Quarantine in the Bureau of the Public Health Service in Washington, D. C.

Mr. Rudd Honored.

Mr. Wortley F. Rudd, dean of the school of pharmacy of the Medical College of Virginia, was named by the American Conference of Pharmaceutical Faculties as chairman of a committee to visit Newark, N. J., early in November, to inspect the New Jersey College of Pharmacy, now making application for membership in the Conference. This is the third time that Mr. Rudd has been honored with the chairmanship of a similar committee.

Dr. Ratliff Loses Leg.

Dr. John M. Ratliff, Richlands, Va., suffered the loss of his right leg just above the knee, on November 2, as a result of a train hitting his automobile. The accident occurred in the center of the town. His five-year-old son, who was with him, was seriously bruised. Dr. Ratliff was rushed to the hospital, where his leg was amputated. He also suffered severe lacerations and bruises.

Dr. A. M. Showalter,

Christiansburg, Va., who was quite sick for ten days has improved sufficiently to resume his work.

Dr. S. E. Massey,

Martinsville, Va., has been on a visit to South Carolina.

Johnston-Willis Sanatorium to Have New Quarters.

A permit has been issued to the Johnston-Willis Sanatorium Corporation to erect a proposed new structure at 2900 Kensington Avenue, this city, at a cost of approximately

$250,000. The building will front 165 feet on Kensington Avenue, facing the lawn of the Battle Abbey, and will set back thirty feet from the building line. The building is to be fireproof throughout and will contain all modern appliances, fixtures and equipment. Work will be commenced at once.

Dr. Charles H. Mayo,

Of Rochester, Minn., on his way to attend the Norfolk meeting of the Medical Society of Virginia, as an invited guest, stopped over at Williamsburg, Va., and addressed the students of William and Mary College.

Dr. George E. Barksdale,

Formerly of Richmond, who has been stationed at the U. S. Veterans' Hospital at New Haven, Conn., has been transferred to the U. S. Veterans' Hospital No. 60, at Oteen, N. C.

Dr. Carroll A. Davis,

Formerly of Eagle Rock, Va., has located in Logan, West Virginia, where he will limit his practice to diseases of the eye, ear and throat. He has just completed a twelve months' internship at the Baltimore Eye, Ear and Throat Hospital.

The Roanoke Academy of Medicine,

At its regular meeting held on October 2nd, elected the following officers for the coming year:—Dr. R. M. Wiley, Salem, President; Dr. A. P. Jones, Roanoke, first vice-president; Dr. Everett E. Watson, Salem, second vice-president; Dr. K. D. Graves, Roanoke, secretary-treasurer.

Delegates to the State Society elected at this meeting were Drs. Claude Moore and T. Allen Kirk, Roanoke, with Drs. J. D. Willis and J. R. Garrett, Roanoke, alternates.

CLAUDE MOORE, *Sec'y-Treas.*

Dr. Fred E. Steere,

Who has been located in Richmond, Va., for a number of years, has moved to Claremont, Va., to practice his profession.

Dr. B. R. Caldwell,

Of the U. S. Public Health Service, who has been located at the Army Supply base, Norfolk, has been transferred to Tanners Creek, Norfolk, Va.

The Virginia Tuberculosis Association,

At its annual meeting held in Richmond, October 13, elected the following officers:—President, Capt. W. W. Baker, Hallsboro; vice-presidents, J. Leroy Baxley, Markham, and R. Tate Irvine, Big Stone Gap; treasurer, George W. Call, Richmond; secretary, Dr. Roy K. Flannagan, Richmond. The Executive Committee includes Capt. W. W. Baker, Hallsboro, Drs. Roy K. Flannagan, J. T. Mastin and E. C. Levy, of Richmond, Dr. Wm. F. Drewry, Petersburg, Dr. Charles R. Grandy, Norfolk, and Miss Agnes D. Randolph, Richmond, Miss Randolph being the only new member.

Dr. H. A. Latane, Alexandria, A. Lambert Martin, Catawba Sanatorium, Mrs. F. B. Croxton, director of public health nurses, State Board of Health, and Miss Juanita J. Woods, of the Richmond Instructive Visiting Nurses' Association, were elected to fill vacancies on the board of directors.

Dr. E. C. Levy,

Director of Public Welfare of the city of Richmond, was elected president of the American Public Health Association, at its annual meeting held in Cleveland, Ohio, in October. Dr. Levy has been connected with public health work in Richmond for about fifteen years and has only recently been reappointed as Director of Public Welfare for another term.

The American Electrotherapeutic Association,

At its annual meeting held recently in New York City, elected Dr. Frank E. Peckham, Providence, R. I., president. Dr. Abram Bern Hirsch, New York City, was re-elected recording secretary.

The Southern Surgical Association

Is to hold its annual meeting in Memphis, Tenn., December 12-14, under the presidency of Dr. C. Jeff Miller, of New Orleans. Dr. H. A. Royster, Raleigh, N. C., is secretary of this Association.

The Virginia State Dental Association,

At its annual meeting held in Richmond, the middle of October, elected Dr. W. M. Sturgis, Marshall, president; Dr. C. B. Gifford, Norfolk, vice-president; and re-elected Dr. Harry Bear, Richmond, secretary-treasurer. It was voted to hold the next meeting of this Association jointly with the North Carolina State Dental Association, at Pinehurst, N. C., in May, 1923.

Dr. R. B. Gillespie,

Formerly of Tazewell County, Virginia, has been transferred from Alexandria, La., to U. S. Veterans' Hospital 63, Lake City, Fla.

Dr. P. C. Brittle,

Of Conway, N. C., recently paid a visit to Richmond on business. He was a member of the class of '07 of the former University College of Medicine of this city and has many friends in Virginia.

The Botetourt County Medical Society,

At a meeting held in Fincastle, Va., October 2nd, 1922, elected Dr. E. W. Dodd, Buchanan, president; Dr. J. K. Simmons, Nace, vice-president; and Dr P. K. Graybill, Fincastle, secretary. Dr. M. T. McCulloch, Troutville, was elected delegate to the Norfolk meeting of the State Society.

Dr. C. F. Graham,

High Priest of the Wytheville, Va., Royal Arch Chapter, attended the meeting of the Grand Royal Arch Chapter in Richmond, the latter part of October.

Dr. M. G. Robinson,

King of the Wytheville, Va., Royal Arch Chapter, was also among those who attended the meeting of the Grand Royal Arch Chapter in Richmond, recently.

Dr. J. N. Greear, Jr.,

Of the class of '20, University of Virginia, is serving on the house staff at Manhattan Eye, Ear and Throat Hospital, New York City, for a year, his service ending October 1, 1923. He is making a specialty of eye work.

Dr. B. C. Keister,

Formerly of Roanoke, Va., is again at his late home in Americus, Ga., after a stay of several months in El Paso, Texas.

Dr. and Mrs. Mark W. Peyser

Returned to their home in Richmond, about the middle of October, after a motor trip through Ohio, Pennsylvania and Maryland.

Dr. C. C. Hudson,

Of the Richmond Bureau of Health, spent a week visiting relatives in Kentucky, on his return from the meeting of the American Public Health Association in Cleveland.

Dr. A. J. Hurt,

Chester, Va., has been elected one of the directors of the Chesterfield Fair Association for the coming year.

Dr. John A. Owen,

Turbeville, Va., was a recent visitor in this city, having come as a delegate to the Presbyterian Synod.

Wanted.

January 1, 1923, three (3) full time young doctors for Public Health Work in a large Virginia city. Salary to begin with three thousand ($3,000.00) dollars per year and expenses incident to the duties of the position. State age, place and date of graduation. Address "Health Work" care *Virginia Medical Monthly*. (Adv.)

Wanted.

Young physician qualified to practice medicine in Virginia, who would be interested in an industrial position. Can get in touch with good proposition by addressing "Industrial," care *Virginia Medical Monthly*. (Adv.)

Obituary

Dr. Halbert Porter Harris

Died suddenly at his home in Wake Forest, N. C., October 7, at the age of forty. He was graduated from the University College of Medicine, Richmond, in 1909, and from the Army Medical School, Washington, in 1913. He then served in the medical corps of the Army. On account of chronic nephritis, he was retired with the rank of major six years ago. In spite of this, however, he served throughout the World War, receiving a temporary Lieutenant Colonelcy. Dr. Harris is survived by his wife, who was Miss Jennie Page, of Washington, D. C.

Dr. Robert A. Lancaster,

Columbia, S. C., died suddenly at his home on October 18. He was born in Tennessee 62 years ago but received his medical education in this city, having graduated from the Medical College of Virginia in 1882. He practiced in Richmond for a short time after graduation. Dr. Lancaster is survived by his wife and four children.

Dr. Karl Von Ruck,

A widely known specialist on tuberculosis, died at his residence in Asheville, N. C., November 5, after an illness of several weeks. He was seventy-three years of age and had received his medical education in Germany, later taking a course at the University of Michigan, from which he graduated in 1879. He was medical director of Winyah Sanatorium, Asheville.